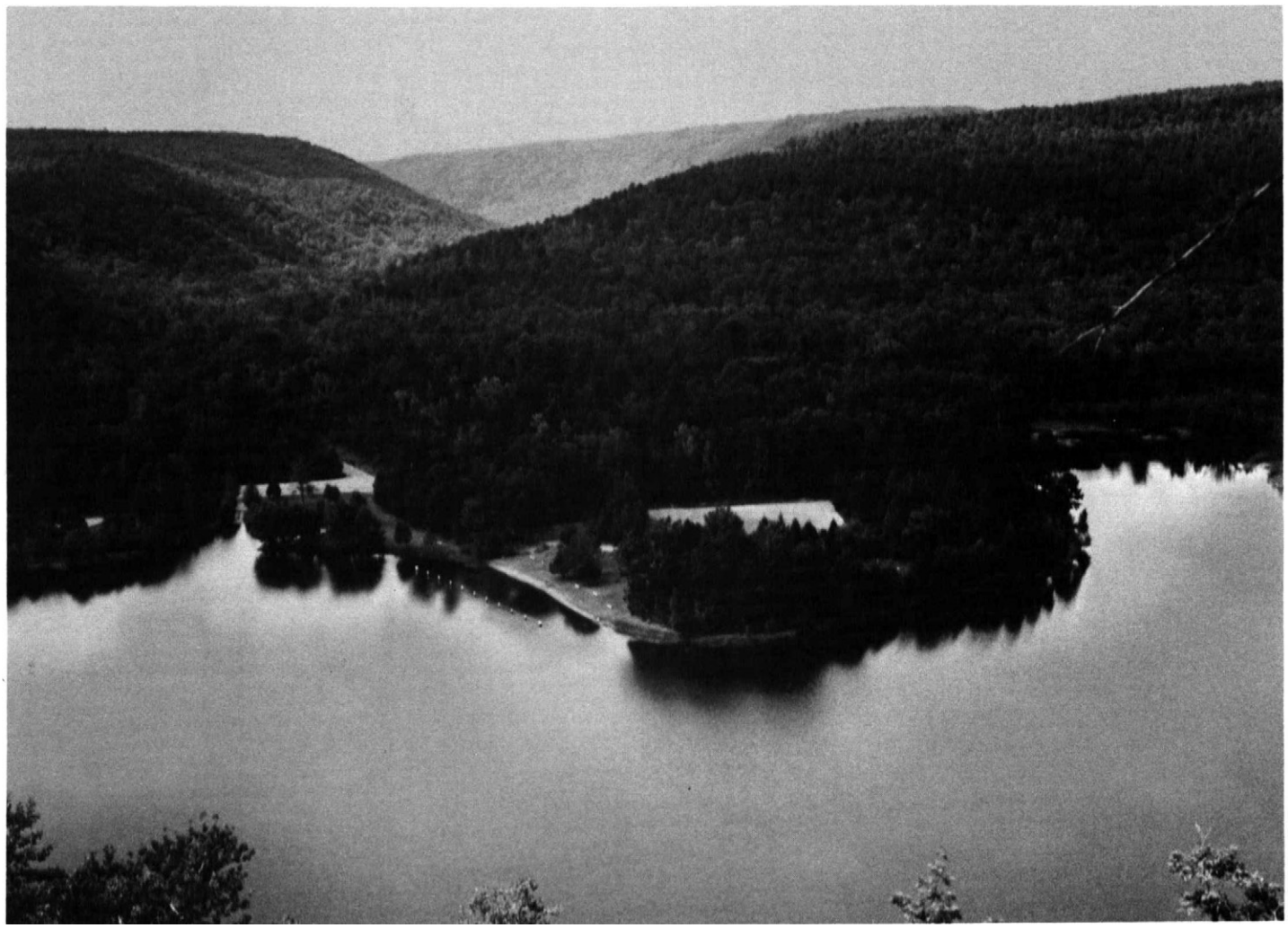
SOIL SURVEY

Franklin County, Arkansas



UNITED STATES DEPARTMENT OF AGRICULTURE
Soil Conservation Service and Forest Service
In cooperation with
ARKANSAS AGRICULTURAL EXPERIMENT STATION

Issued February 1971

Major fieldwork for this soil survey was done in the period 1960–65. Soil names and descriptions were approved in 1967. Unless otherwise indicated, statements in the publication refer to conditions in the county in 1965. This survey was made cooperatively by the Soil Conservation Service, the Forest Service, and the Arkansas Agricultural Experiment Station. It is part of the technical assistance furnished to the Franklin County Soil and Water Conservation District.

Either enlarged or reduced copies of the soil map in this publication can be made by commercial photographers, or they can be purchased on individual order from the Cartographic Division, Soil Conservation Service, United States Department of Agriculture, Washington, D.C. 20250.

HOW TO USE THIS SOIL SURVEY

THIS SOIL SURVEY contains information that can be applied in managing farms, ranches, and woodlands; in selecting sites for roads, ponds, buildings, or other structures; and in determining the suitability of tracts of land for farming, industry, or recreation.

Locating Soils

All of the soils of Franklin County are shown on the detailed map at the back of this survey. This map consists of many sheets that are made from aerial photographs. Each sheet is numbered to correspond with a number shown on the Index to Map Sheets.

On each sheet of the detailed map, soil areas are outlined and are identified by symbol. All areas marked with the same symbol are the same kind of soil. The soil symbol is inside the area if there is enough room; otherwise, it is outside and a pointer shows where the symbol belongs.

Finding and Using Information

The "Guide to Mapping Units" can be used to find information in this publication. This guide lists all of the soils of the county in alphabetic order by map symbol. It shows the capability unit, woodland group, wildlife group, and range site for each soil. It also shows the page where each kind of soil and each capability unit and range site is described.

Interpretations not included in this survey can be developed by grouping the soils according to their suitability or limitations for a particular use. Translucent material can be used as an overlay over the soil map and colored to show soils that have the same limitation or suitability. For example, soils that have a slight limitation for a given use can be colored green, those with a moderate limitation can be colored yellow, and those with a severe limitation can be colored red.

Farmers and those who work with them can learn about use and management of the soils from the soil descriptions and from the discussions of the capability units, the woodland groups, the range sites, and the wildlife groups.

Foresters and others can refer to the section "Use of the Soils for Woodland," where the soils of the county are grouped according to their suitability for trees.

Game managers, sportsmen, and others can find information about soils and wildlife habitat in the section "Use of the Soils for Wildlife."

Ranchers and others can find under "Use of the Soils for Range" groupings of the soils according to their suitability for range and descriptions of the vegetation on each range site.

Community planners and others concerned with nonfarm development can read about the soil properties that affect the choice of homesites, industrial sites, and recreational sites in the section "Nonfarm Use of the Soils."

Engineers and builders can find under "Use of the Soils in Engineering" tables that describe soil properties that affect engineering and show the relative suitability of the soils for specified engineering purposes.

Scientists and others can read about how the soils formed and how they are classified in the section "Formation and Classification of the Soils."

Newcomers in Franklin County may be especially interested in the section "General Soil Map," where broad patterns of soils are described. They may also be interested in the section "General Nature of the County."

Cover picture:
Linker and Mountainburg soils on mountaintops; Allen and Enders soils on mountainsides; Cleora and Dubbs soils in valleys.

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Issued February 1971

SOIL SURVEY OF FRANKLIN COUNTY, ARKANSAS

BY FRANK M. VODRAZKA AND FRANCIS H. STEPHENS, SOIL CONSERVATION SERVICE, AND WILLIAM K. GODDARD AND JAMES W. SPOTTS, FOREST SERVICE

UNITED STATES DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE AND FOREST SERVICE, IN COOPERATION WITH THE ARKANSAS AGRICULTURAL EXPERIMENT STATION

FRANKLIN COUNTY is in the western part of Arkansas (fig. 1). The total area is 398,720 acres, or 623 square miles. The Arkansas River flows across the county from west to east. The Ozark Lock and Dam, which is about a mile downstream from the city of Ozark, forms a long, narrow reservoir that extends upstream past the west county line.

Franklin County has two county seats. Ozark, which is in the central part, is the seat of most county services. Charleston, in the southwestern part, serves most of the area south of the Arkansas River.

In 1960, the total population was 10,213. Ozark had a population of 1,965. In 1964, Charleston had a population of 1,353. Branch, Altus, Denning, and Webb City have less than 500 population each.

The northern third of the county is in the Boston Mountains. About 119,000 acres of the county is within the boundary of the Ozark National Forest. About 99,000 acres of this tract is federally owned; the rest is chiefly in small, private holdings. About 10,800 acres in the southwestern corner is part of the Fort Chaffee Military Reservation.

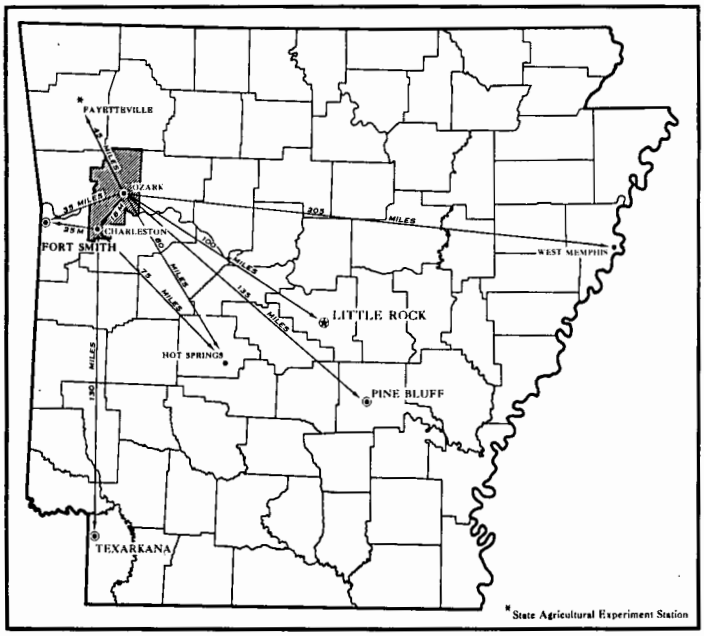

Figure 1.—Location of Franklin County in Arkansas.

The more fertile soils in Franklin County are on the narrow flood plains along the Arkansas and Mulberry Rivers. They are used chiefly for row crops. On the uplands, where the soils are less fertile, livestock raising and timber production are the main enterprises.

How This Survey Was Made

Soil scientists made this survey to learn what kinds of soils are in Franklin County, where they are located, and how they can be used. They went into the county knowing they likely would find many soils they had already seen and perhaps some they had not. As they traveled over the county, they observed steepness, length, and shape of slopes; size and speed of streams; kinds of native plants or crops; kinds of rock; and many facts about the soils. They dug many holes to expose soil profiles. A profile is the sequence of natural layers, or horizons, in a soil; it extends from the surface down into the parent material that has not been changed much by leaching or by roots.

The soil scientists made comparisons among the profiles they studied, and they compared these profiles with those in counties nearby and in places more distant. They classified and named the soils according to nationwide, uniform procedures. To use this publication efficiently, it is necessary to know the kinds of groupings most used in a local soil classification.

Soils that have profiles almost alike make up a soil series. Except for different texture in the surface layer, the major horizons of all the soils of one series are similar in thickness, arrangement, and other important characteristics. Each soil series is named commonly for a town or other geographic feature near the place where a soil of that series was first observed and mapped. Enders and Mountainburg, for example, are the names of two soil series. All the soils in the United States having the same series name are essentially alike in those characteristics that affect their behavior in the natural, undisturbed landscape. Soils of one series can differ somewhat in the texture of the surface layer and in slope, stoniness, or some other characteristic that affects use of the soils by man.

Many soil series contain soils that differ in the texture of their surface layer. According to such differences in texture, separations called soil types are made. Within

a series, all the soils having a surface layer of the same texture belong to one soil type. Enders gravelly silt loam and Enders stony fine sandy loam are two soil types in the Enders series. The difference in the texture of their surface layers is apparent from their names.

Some types vary so much in slope, degree of erosion, number and size of stones, or some other feature affecting their use, that practical suggestions about their management could not be made if they were shown on the soil map as one unit. Such soil types are divided into soil phases. (*12*).[1] The name of a soil phase indicates a feature that affects management. For example, Enders gravelly silt loam, 3 to 8 percent slopes, eroded, is one of two phases of Enders gravelly silt loam, a soil type that has a slope range of 3 to 20 percent.

After a guide for classifying and naming the soils had been worked out, the soil scientists drew the boundaries of the individual soils on aerial photographs. These photographs show woodlands, buildings, field borders, trees, and other details that help in drawing boundaries accurately. The soil map at the back of this survey was prepared from the aerial photographs.

The areas shown on a soil map are called mapping units. On most maps detailed enough to be useful in planning management of farms and fields, a mapping unit is nearly equivalent to a soil type or a phase of a soil type. It is not exactly equivalent, because it is not practical to show on such a map all the small, scattered bits of soil of some other kind that have been seen within an area that is dominantly of a recognized soil type or soil phase.

In preparing some detailed maps, the soil scientists have a problem of delineating areas where different kinds of soils are so intricately mixed or occur in such small individual tracts that it is not practical to show them separately on the map. They show such a mixture of soils as one mapping unit and call it a soil complex. Ordinarily, a soil complex is named for the major kinds of soil in it, for example, Montevallo-Mountainburg complex, 1 to 12 percent slopes.

Some mapping units contain more than one kind of soil in a pattern more open and less intricate than that of a soil complex. Such a mapping unit is called a soil association. A soil association differs from a soil complex in that its component soils can be mapped separately, at ordinary scales, such as 4 inches per mile, if practical advantages make the effort worthwhile. Separate mapping at ordinary scales is not possible for a soil complex. A soil association, like a soil complex, is named for the major soils in it, for example, Allen-Mountainburg association, rolling.

Another kind of mapping unit is the undifferentiated group, which consists of two or more soils that may occur together without regularity in pattern or relative proportion. The individual tracts of the component soils could be shown separately on the map, but the differences between the soils are so slight that the separation is not important for the objectives of the soil survey. An example is Bruno and Iuka soils.

Most surveys include areas where the soil material is so rocky, so shallow, or so frequently worked by wind and water that it cannot be classified by soil series. Such an area is shown on the soil map like other mapping units, but it is given a descriptive name, such as Cobbly alluvial land or Rock land, and is called a land type.

While a soil survey is in progress, samples of soils are taken, as needed, for laboratory measurements and for engineering tests. Laboratory data for the same kinds of soils in other places are assembled. Data on yields of crops under defined practices are assembled from farm records and from field and plot experiments on the same kinds of soils. Yields under defined management are estimated for all the soils.

But only part of a soil survey is done when the soils have been named, described, and delineated on the map and the laboratory data and yield data have been assembled. The mass of detailed information then needs to be organized in such a way that it is readily useful to different groups of readers, among them farmers, ranchers, managers of woodland, engineers, urban planners, and homeowners. Grouping soils that are similar in suitability for each specified use is the method of organization commonly used in the soil surveys. The soil scientists set up trial groups based on the yield and practice tables and other data. They test these groups by further study and by consultation with farmers, agronomists, engineers, and others; then they adjust the groups according to the results of their studies and consultation. Thus, the groups that are finally evolved reflect up-to-date knowledge of the soils and their behavior under present methods of use and management.

General Soil Map

The general soil map in this publication shows, in color, the soil associations in Franklin County. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another, but in a different pattern.

A map showing soil associations is useful to people who want a general idea of the soils in a county, who want to compare different parts of a county, or who want to know the location of large tracts that are suitable for a certain kind of farming or other land use. Such a map is also useful in determining the value of an association for a watershed, for woodland, for wildlife habitat, for engineering projects, for recreational areas, and for community development. A general soil map is not suitable for planning the management of a farm or field, because the soils in any one association ordinarily differ in slope, depth, stoniness, drainage, and other characteristics that affect management.

The seven soil associations of Franklin County are described in the following paragraphs.

1. Allen-Mountainburg-Enders association

Deep to shallow, well-drained, moderately steep to very steep, gravelly and stony soils on mountains and in valleys; gravelly fine sandy loam to clay subsoil

This association is characterized by strongly dissected mountainsides that rise from narrow stream valleys in a succession of slopes and benches. The gradient is 12 to

[1] Italic numbers in parentheses refer to Literature Cited, p. 92.

65 percent. The ridgetops are long and winding and are less than a fourth of a mile to no more than half a mile wide. The areas in the central and southern parts of the county are at elevations of 600 to 1,100 feet, and those in the northern part are at elevations of 1,200 to 2,400 feet. The underlying rocks on the mountainsides are alternate layers of acid shale and sandstone. The caprock is hard sandstone. This association occupies about 40 percent of the county. It is mainly in the northern part.

Allen and Enders soils are on the mountainsides (fig. 2). Mountainburg soils are commonly on narrow ridgetops and ledges.

Allen soils make up about 38 percent of the association. They are deep soils that formed in material that weathered from sandstone and shale and then washed or rolled downhill from higher lying slopes. These soils contain varying amounts of gravel and stones. Their surface layer is dark-brown, brown, or dark grayish-brown fine sandy loam, and their subsoil is red or yellowish-red clay loam or sandy clay loam.

Mountainburg soils make up about 20 percent of the association. They are gravelly and stony and are only 12 to 20 inches thick over sandstone. Their surface layer is dark grayish-brown, brown, or dark-brown fine sandy loam, and their subsoil is reddish-brown to yellowish-red loam or fine sandy loam.

Enders soils make up about 20 percent of the association. They are deep. The surface layer consists of weathered material that washed or rolled from higher lying slopes. It is gravelly or stony, very dark grayish-brown to dark-brown fine sandy loam 5 to 12 inches thick. The subsoil is mottled red and gray, plastic clay or silty clay 2½ to 4½ feet thick.

The rest of this association consists of Cleora, Dubbs, Holston, Linker, and Montevallo soils, and Rock land.

More than 95 percent of this association is wooded (fig. 3). Practically all of the cleared acreage is on ridgetops and mountain benches and in stream valleys. The cleared areas are parts of small livestock farms. Some are pastured, some are cultivated to feed crops for livestock, some are planted to pine trees, and some are idle.

Except for the benches, the middle parts of the narrow ridgetops, and the parts of stream valleys that are above the level of frequent overflow, this association is not suited to farming. Soils on the mountainsides are steep, stony, difficult to till, and low to moderate in fertility. The erosion hazard is very severe in cleared areas.

The major soils of this association have some very severe limitations for intensive nonfarm development, for example, parks, playgrounds, golf courses, and residential and industrial building sites. Highway construction, as well as other construction, is difficult. If cuts

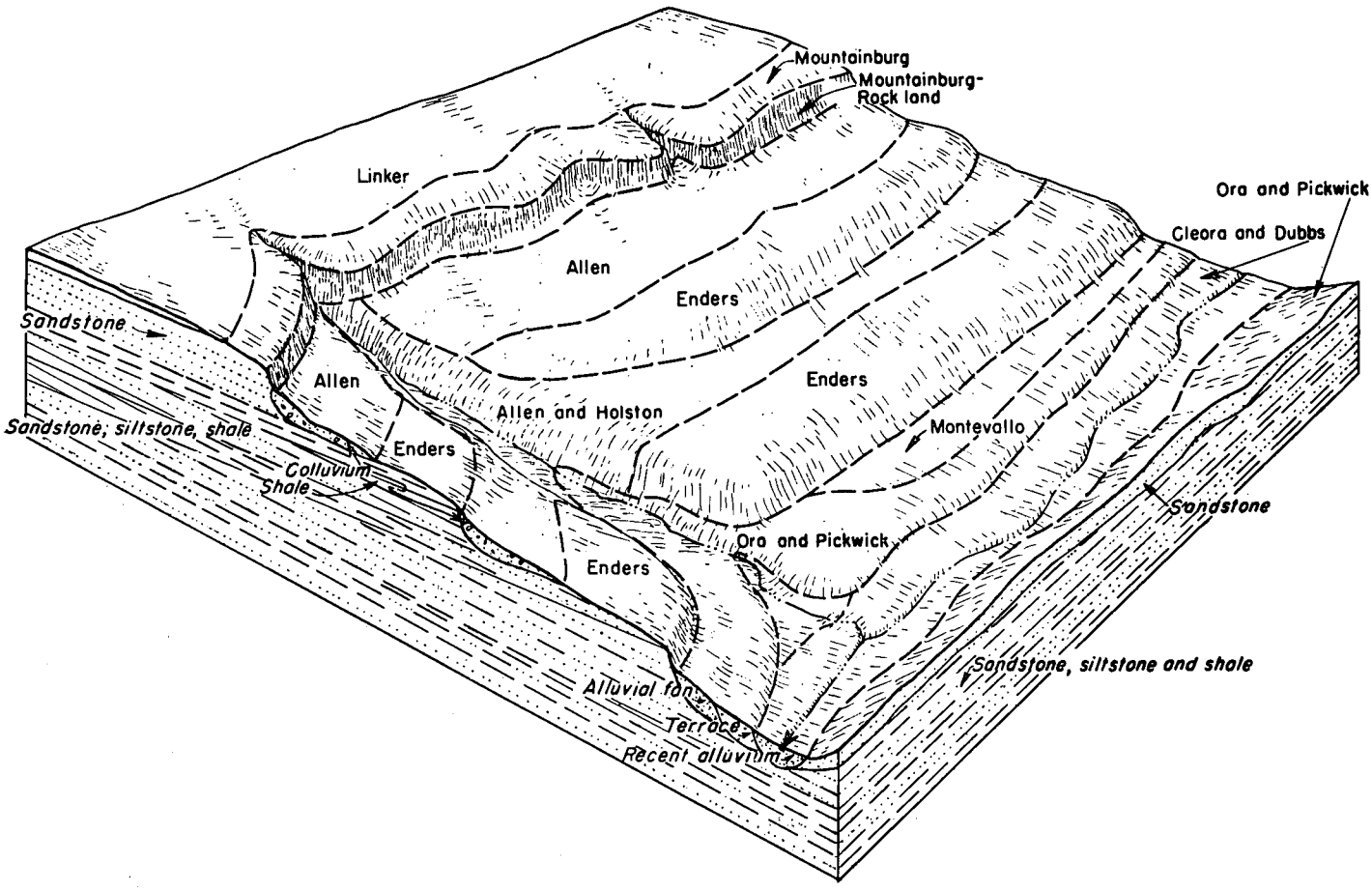

Figure 2.—Typical pattern of soils and underlying material in Boston Mountains. Soils are in associations 1, 2, 3, and 4.

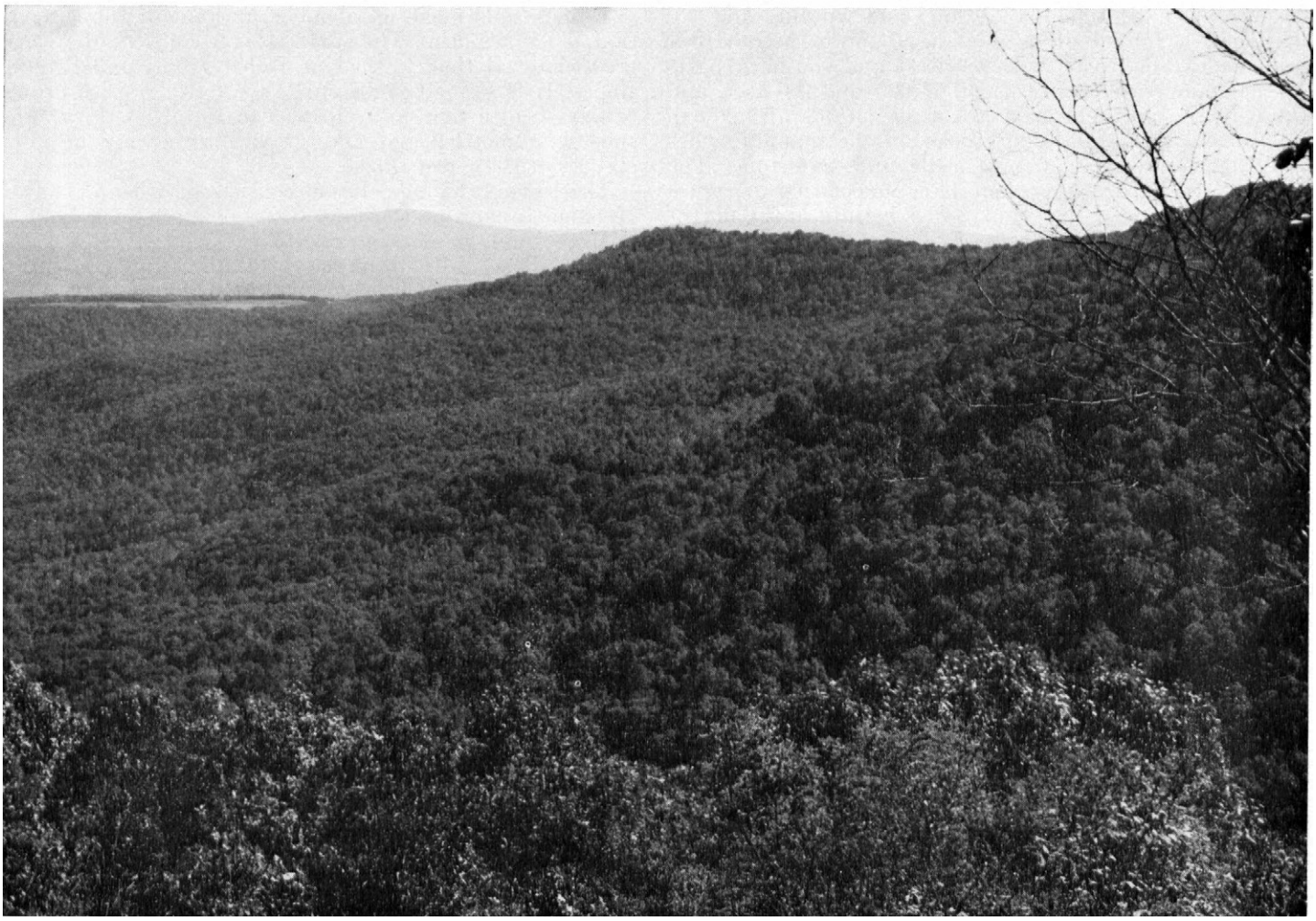

Figure 3.—Typical landscape of association 1.

are made in hillsides, the soils, particularly the Enders soils, are likely to slip and slide.

This association is well suited to vegetation that provides wildlife food and cover. It is also well suited to use for recreational activities, such as hunting and hiking. Some parts are suited to camping.

2. *Linker-Mountainburg association*

Deep to shallow, well-drained, nearly level to moderately sloping and rolling soils on ridges, hilltops, and mountaintops; gravelly fine sandy loam to clay loam subsoil

This association occurs on ridges, hilltops, and mountaintops throughout the county. The areas are a fourth of a mile to 8 miles wide and 2 to 12 miles long. The elevation ranges from about 400 to 2,400 feet. The gradient is dominantly 2 to 12 percent. This association occupies about 33 percent of the county. The largest area is north of Ozark; it extends all the way across the county.

Linker soils are deeper than Mountainburg soils and are mainly on nearly level parts of the ridges, hilltops, and mountaintops. Mountainburg soils are shallow over sandstone. Both soils developed in material weathered from sandstone and contain varying amounts of gravel and stones.

Linker soils make up about 40 percent of this association. They have a surface layer of grayish-brown or very dark grayish-brown to dark-brown fine sandy loam and a subsoil of red or yellowish-red clay loam or sandy clay loam 2 or 3 feet thick. Below this is sandstone.

Mountainburg soils make up about 40 percent of the association. They are generally gravelly and stony throughout. They have a surface layer of dark grayish-brown to brown fine sandy loam and a subsoil of reddish-brown to yellowish-red loam or fine sandy loam. The depth to sandstone is 12 to 20 inches.

The rest of this association consists of Allen, Ora, Leadvale, and Enders soils, and Rock land.

Most of this association has been cleared, but about a third of it is now wooded. The cleared areas are parts of farms that are between 40 and 300 acres in size. Most are used for hay or pasture. Some are idle. Almost every farm has a few beef cattle. Some have vineyards and peach orchards. Many of the farms are occupied by part-

time farmers. There are only a few full-time farmers. Some farms are abandoned.

This association is fairly well suited to farming. The erosion hazard is moderate to severe in cleared areas, the available water capacity is low to moderate, and natural fertility is low. Pasture and hay crops grow fairly well.

The dominant soils of this association have limitations that differ widely, depending on the slope gradient and the depth to bedrock, for intensive nonfarm development. Sandstone bedrock at or near the surface is a severe limitation in the construction of highways or heavy industrial buildings. Parts of the association have suitable residential building sites. The limitations for septic tank drainage fields are moderate or severe on Linker soils and very severe on Mountainburg soils.

3. *Pickwick-Ora association*

Deep, well drained to moderately well drained, nearly level to gently sloping soils on stream terraces; dominantly clay loam or silty clay loam subsoil

This association is on nearly level to gently sloping stream terraces about 400 to 700 feet above sea level. It occupies about 4 percent of the county and is in the central part. The largest areas are east and west of Ozark. The gradient is predominantly 2 to 8 percent.

Pickwick soils are on the higher, well-drained terraces. Ora soils are on the lower, moderately well drained terraces and foot slopes. Both soils developed chiefly in alluvium.

Pickwick soils make up about 65 percent of the association. Their surface layer is dark grayish-brown or brown to dark yellowish-brown silt loam. Their subsoil is yellowish-red or red loam, clay loam, or silty clay loam, 3 to 5 feet thick. Below this is stratified gravel, sand, or sandy loam.

Ora soils make up about 20 percent of the association. Their surface layer is dark grayish-brown to yellowish-brown fine sandy loam. Their subsoil is strong-brown to yellowish-red heavy fine sandy loam to clay loam to a depth of 2 to 3 feet. Below this is a fragipan of mottled red and brown, compact and brittle fine sandy loam to clay loam or sandy clay loam. Below a depth of 5 to 7 feet is either bedrock or stratified sand and gravel.

The rest of the association consists of Leadvale, Muskogee, McKamie, Taft, Linker, and Mountainburg soils.

Most of this association is farmland. The farms are between 40 and 200 acres in size. Most have beef cattle. Some of the acreage is used for pasture or meadow, and some is cultivated to feed crops for livestock. Most of the farms are occupied by part-time farmers.

This association is well suited to livestock production and fairly well suited to general farming. Natural fertility is low, the available water capacity is moderate, and the erosion hazard is moderate. Pasture and hay crops grow well.

The major soils of this association have slight to moderate limitations for intensive nonfarm development. They are suited to highway, residential, and light industrial construction. They also are suited to recreational developments. The Ora soils have a fragipan and are severely limited for use as septic tank filter fields.

4. *Cleora-Dubbs association*

Deep, well-drained, level to nearly level soils on flood plains and terraces; fine sandy loam to clay loam subsoil or underlying material

This association (fig. 4) occurs along the Mulberry River and White Oak Creek. It is 400 to 750 feet above sea level. The gradient is predominantly 0 to 3 percent. The individual areas are long and winding and are a fourth of a mile to 1 mile wide. This association occupies about 4 percent of the county. The largest area is along the Mulberry River.

Cleora soils are on the flood plains, and Dubbs soils are on the adjacent terraces. Both soils developed in alluvium.

Cleora soils make up about half of the association. They have a surface layer of very dark grayish-brown to dark-brown fine sandy loam. The underlying material is dark-brown to dark yellowish-brown, stratified loam to gravelly sandy loam that is 2½ to more than 6 feet thick over gravel beds.

Dubbs soils make up about 30 percent of the association. They have a surface layer of dark grayish-brown to brown fine sandy loam and a subsoil of dark yellowish-brown to reddish-brown loam, silt loam, sandy clay loam, or clay loam. Below this there is commonly a layer of rounded gravel 2½ to more than 5 feet thick.

The rest of this association consists of Pickwick, Taft, and Guthrie soils.

About 80 percent of this association is cleared and used for pasture, hay, and feed crops. Most of the cleared areas are parts of farms that are between 80 and 320 acres in size. Many of the farms extend into associations 1 and 2. Most wooded areas are along streambanks or are plantings in old fields. Most of the wooded areas are part of the Ozark National Forest.

This association is well suited to livestock production. Natural fertility is medium to low, the available water capacity is moderate, and the erosion hazard is slight. Pasture and hay crops grow well.

The major soils of this association have slight to severe limitations for intensive nonfarm development. They are remote from population centers. Except in areas subject to overflow, they are fairly well suited to highway construction as well as to other construction. They are also fairly well suited to recreational developments.

5. *Leadvale-Taft association*

Deep, moderately well drained to somewhat poorly drained, level to nearly level soils in valleys and on stream terraces; silt loam and silty clay loam upper subsoil over a fragipan

This association is on nearly level terraces and valley fill about 350 to 600 feet above sea level. The individual areas are half a mile to 4 miles wide and 2 to 9 miles long. The gradient is predominantly 0 to 3 percent. This association occupies about 8 percent of the county and occurs in the east-central and southern parts (fig. 5). The largest area is southeast of Charleston.

The dominant soils in this association, the Leadvale and Taft, both formed in alluvium.

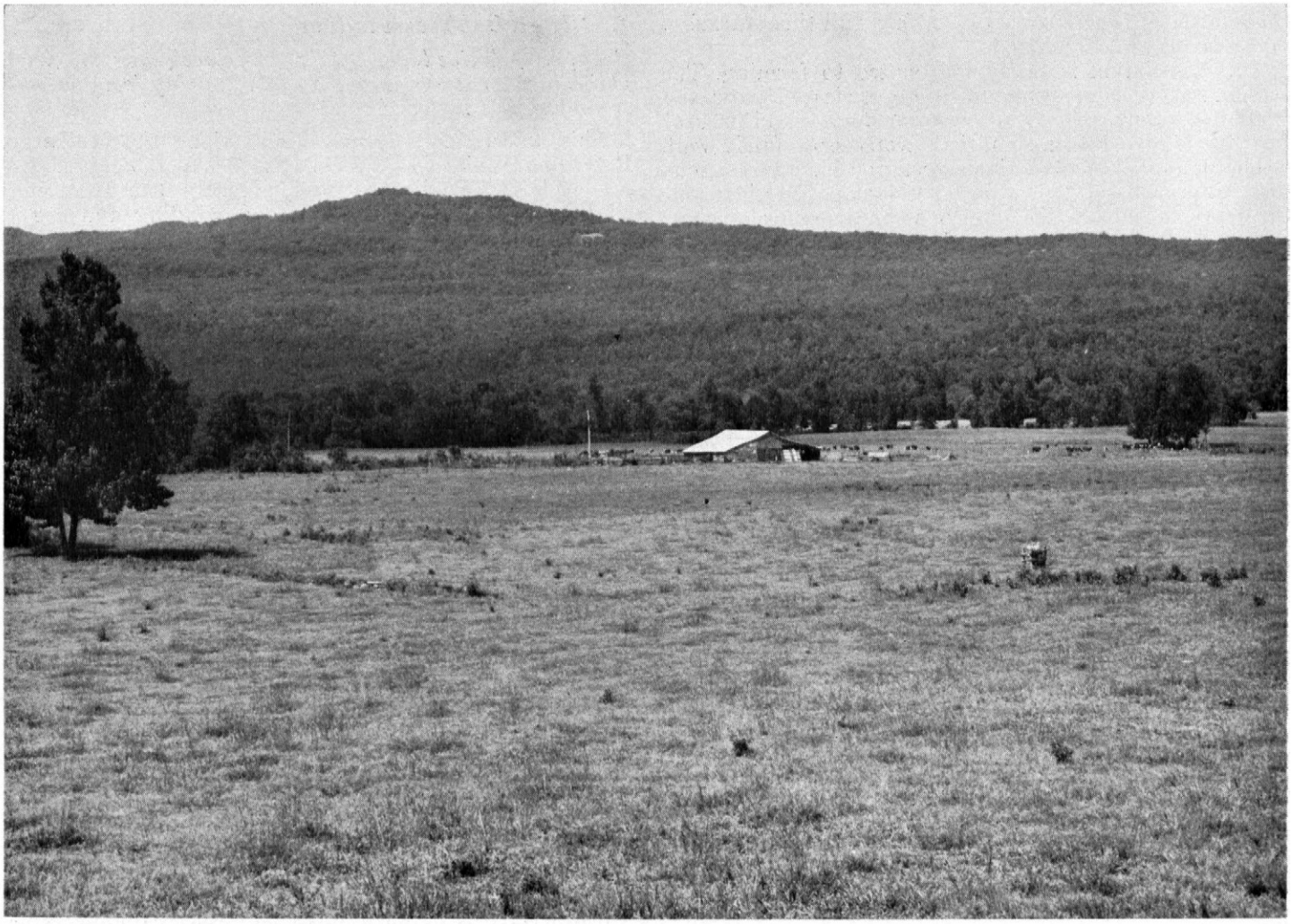

Figure 4.—Association 4 in foreground, and association 1 in background.

Leadvale soils make up about 65 percent of the association. They have a surface layer of dark grayish-brown to dark yellowish-brown silt loam. The upper part of the subsoil is yellowish-brown silt loam, clay loam, or silty clay loam. Beginning at a depth of 18 to 26 inches is mottled brown and gray, compact and brittle silty clay loam or clay loam 2 to more than 4 feet thick. Below this is stratified sand and gravel or bedrock.

Taft soils make up about 20 percent of the association. They have a surface layer of dark grayish-brown to dark yellowish-brown silt loam. The upper part of the subsoil is grayish-brown or dark-brown to yellowish-brown silt loam mottled with gray. Beginning at a depth of 14 to 23 inches is mottled grayish-brown and gray, compact and brittle silty clay loam that is 2 to more than 4 feet thick. Below this is bedrock or stratified sand and gravel.

The rest of the association consists of Guthrie and Ora soils.

Most of this association is farmland. Most of the farms are between 40 and 200 acres in size. Some of the acreage is used for pasture and meadow, and some for feed crops. Almost every farm has beef cattle. Most of the farms are occupied by part-time farmers.

This association is well suited to livestock production. Natural fertility is low, the available water capacity is moderate, and the erosion hazard is moderate. Pasture and hay crops grow well.

The major soils of this association have moderate to severe limitations for intensive nonfarm development. They are fairly well suited to highway construction as well as to other construction. The limitations for septic tank drainage fields are very severe. The limitations for recreational developments are slight on Leadvale soils and severe to very severe on Taft soils.

6. *Falkner association*

Deep, somewhat poorly drained, level to nearly level soils in valleys; dominantly silty clay loam upper subsoil over a claypan

This association is one of level to nearly level areas, slight depressions, and low mounds. It is about 400 to 600 feet above sea level. Individual areas are 1 mile to 5 miles wide and 2 to 9 miles long. The gradient is predominantly 0 to 3 percent. This association occupies about 7 percent of the county. It is in the southern part. The largest area is north of Charleston.

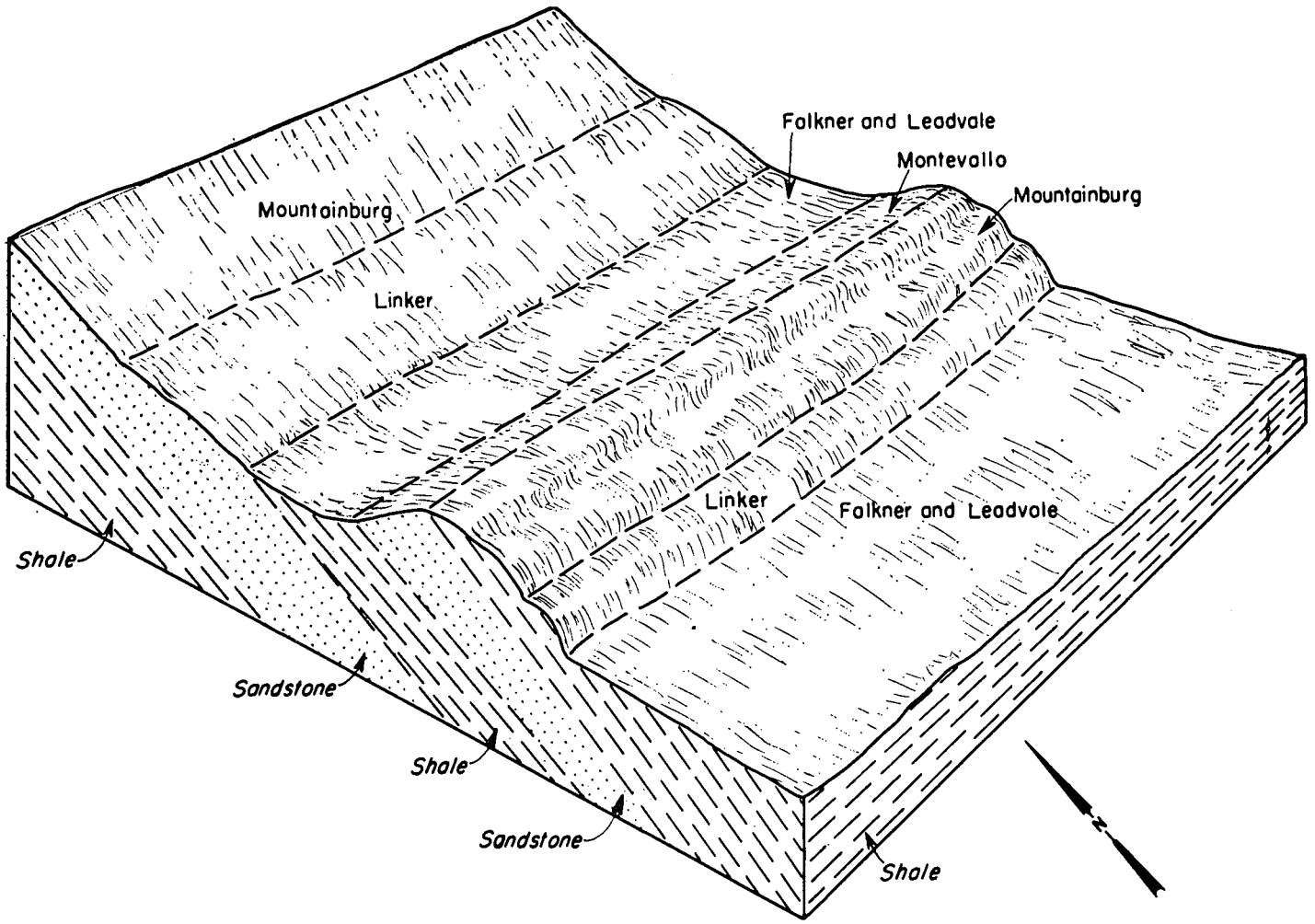

Figure 5.—**Typical pattern of soils and underlying material in southern part of Arkansas valley. Soils are in associations 2, 5, and 6.**

Falkner soils developed in residuum from acid shale. The native vegetation consisted mostly of prairie grasses and forbs.

Falkner soils make up about 75 percent of this association. Their surface layer is dark grayish-brown to dark yellowish-brown silt loam. The upper part of the subsoil is mottled grayish-brown to yellowish-brown silt loam or silty clay loam. At a depth of 13 to 31 inches is a claypan. The pan is gray, grayish-brown, or light brownish-gray silty clay or clay mottled with red or brown. The depth to shale bedrock ranges from 5 feet to more than 8 feet.

The rest of the association consists of Ora, Taft, and Leadvale soils.

Most of this association is cleared. There are only scattered patches of hardwoods and pines. Most of the farms are between 80 and 320 acres in size. Some of the cleared areas are used for pasture or meadow, and some for feed crops. The farms have beef and dairy cattle.

This association is well suited to dairying and general livestock production. Natural fertility is medium to low, and the available water capacity is moderate. Wetness is a severe hazard in level areas, and erosion a slight hazard in nearly level areas. Pasture and hay crops grow well.

This association has moderate to severe limitations for intensive nonfarm development. It is poorly suited to highway construction, as well as to other construction. The limitations for septic tank drainage fields are very severe.

7. *Bruno-Morganfield-Caspiana association*

Deep, excessively drained to well-drained, level to gently sloping and undulating soils on flood plains; loamy fine sand to clay loam subsoil or underlying material

This association is along the Arkansas River, in the central part of the county (fig. 6). It is 350 to 400 feet above sea level. The individual areas are a fourth of a mile to 3 miles wide and 2 to 8 miles long. The gradient is dominantly 0 to 5 percent. This association occupies about 4 percent of the county. The largest areas are south of Alix and Ozark and southwest of Toney.

Bruno soils occupy the highest positions and are adjacent to the river. Morganfield soils are on intermediate positions between Bruno and Caspiana soils. Caspiana soils occupy the lowest positions and are farthest from the river.

348-988—71—2

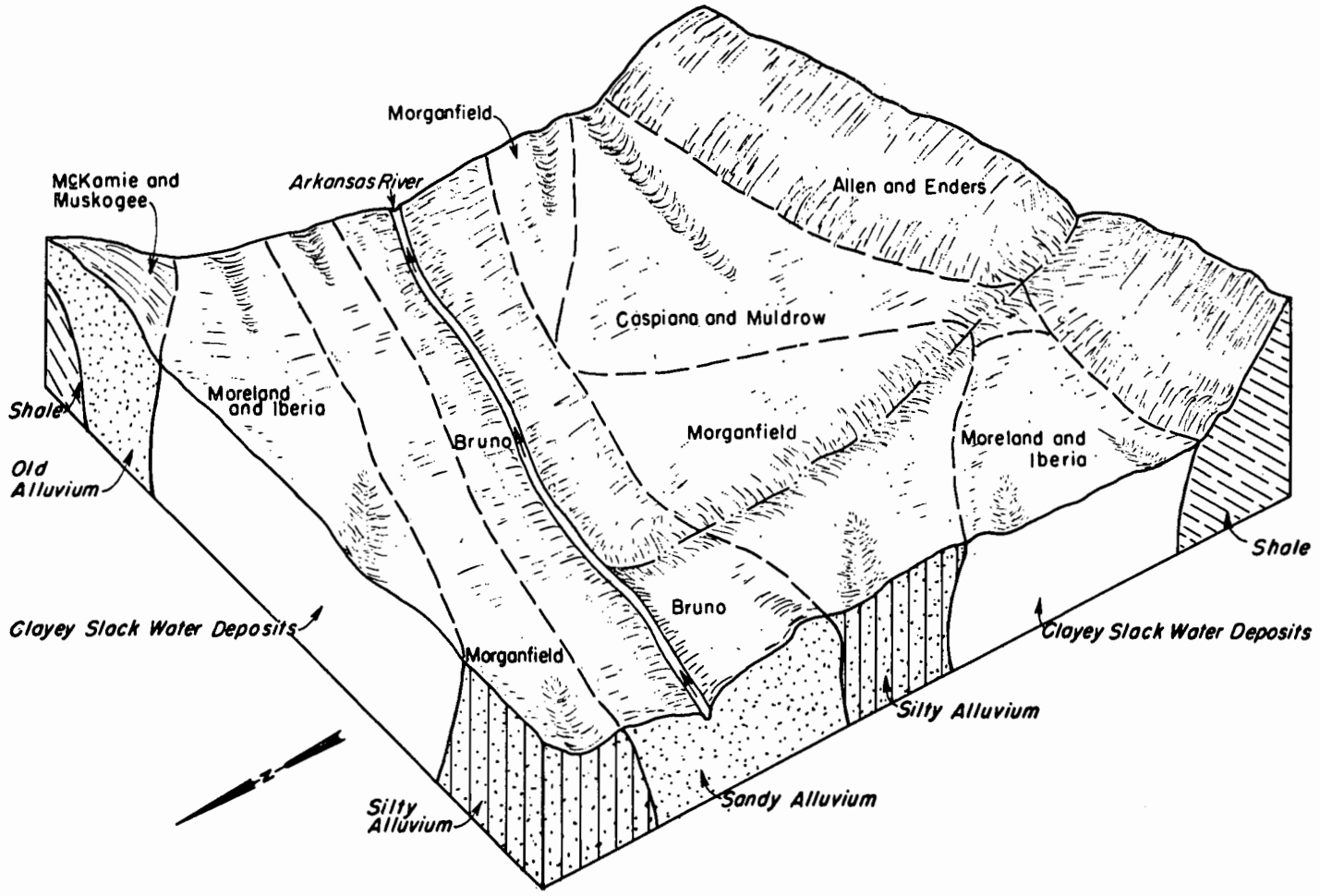

Figure 6.—**Typical pattern of soils and underlying material in valley along the Arkansas River. Soils are in associations 1 and 7.**

Bruno soils make up about 31 percent of the association. Their surface layer is very dark grayish-brown to light yellowish-brown loamy fine sand. It is underlain by yellowish-brown to reddish-brown fine sand to loamy fine sand. Stratified sand, silt, clay, and gravel are common at a depth of 4 to 8 feet.

Morganfield soils make up about 25 percent of the association. Their surface layer is dark-brown to dark reddish-brown or reddish-brown very fine sandy loam. It is underlain by dark-brown to reddish-brown or dark reddish-brown very fine sandy loam. Below this are stratified loam, sand, and silt. The depth to the stratified material is 4 to 7 feet.

Caspiana soils make up about 15 percent of the association. They have a surface layer of very dark grayish-brown to very dark brown or dark brown silt loam and a subsoil of dark brown or very dark brown to dark reddish-brown or red sandy clay loam, silty clay loam, loam, or clay loam. Below the subsoil is stratified loam, sand, and silt. The depth to the stratified material ranges from 4 to more than 6 feet.

The rest of the association consists of Moreland, Muldrow, and Iberia soils.

About 95 percent of this association is cleared. Most of the cleared areas are cultivated. Some are in pasture or meadow. Most of the farms are between 80 and 600 acres in size and are managed by full-time farmers.

This association is well suited to farming and livestock production. Natural fertility is low to moderate, and the available water capacity is low to moderate. The erosion hazard is slight on the nearly level and undulating soils.

Except for the included clayey soils and the soils subject to overflow, this association is well suited to intensive nonfarm development. It is well suited to highway construction as well as to other construction. It is also well suited to recreational developments. Limitations are severe or very severe for all intensive nonfarm uses in areas where flooding is a hazard.

Descriptions of the Soils

This section describes the soil series and mapping units of Franklin County. The approximate acreage and proportionate extent of each mapping unit are given in table 1.

A general description of each soil series is given, and this is followed by brief descriptions of the mapping units in that series. For full information about any one

TABLE 1.—*Approximate acreage and proportionate extent of the soils*

Soil	Area	Extent	Soil	Area	Extent
	Acres	*Percent*		*Acres*	*Percent*
Allen gravelly fine sandy loam, 3 to 8 percent slopes	4, 495	1. 1	Leadvale silt loam, 1 to 3 percent slopes	15, 245	3. 8
Allen gravelly fine sandy loam, 8 to 12 percent slopes	1, 744	. 4	Leadvale silt loam, 3 to 8 percent slopes, eroded	12, 690	3. 2
Allen stony fine sandy loam, 8 to 12 percent slopes	824	. 2	Leadvale loam, 8 to 12 percent slopes, eroded	1, 316	. 3
Allen stony fine sandy loam, 12 to 45 percent slopes	1, 410	. 3	Linker fine sandy loam, 1 to 3 percent slopes	3, 753	. 9
Allen soils, gently rolling	1, 104	. 3	Linker fine sandy loam, 3 to 8 percent slopes	32, 032	8. 0
Allen soils, rolling	1, 828	. 5	Linker fine sandy loam, 8 to 12 percent slopes	690	. 2
Allen soils, steep	4, 944	1. 2	Linker soils, gently rolling	1, 403	. 4
Allen-Enders association, rolling	16, 705	4. 2	Linker-Mountainburg association, gently rolling	5, 675	1. 4
Allen-Enders association, steep	24, 978	6. 3	McKamie silt loam, 3 to 8 percent slopes	623	. 2
Allen-Enders association, very steep	5, 854	1. 5	Montevallo gravelly silt loam, 3 to 8 percent slopes	1, 809	. 5
Allen-Mountainburg association, rolling	9, 987	2. 5	Montevallo-Mountainburg complex, 1 to 12 percent slopes	4, 106	1. 0
Allen-Mountainburg association, steep	13, 328	3. 3	Montevallo-Mountainburg complex, 12 to 40 percent slopes	9, 735	2. 4
Allen-Holston association, very steep	14, 769	3. 7	Moreland silty clay loam	685	. 2
Bruno loamy fine sand	2, 766	. 7	Morganfield very fine sandy loam	2, 485	. 6
Bruno and Iuka soils	8, 404	2. 1	Mountainburg gravelly fine sandy loam, 1 to 3 percent slopes	884	. 2
Caspiana silt loam	1, 596	. 4	Mountainburg gravelly fine sandy loam, 3 to 8 percent slopes	40, 629	10. 2
Cleora fine sandy loam, 0 to 1 percent slopes	3, 206	. 8	Mountainburg gravelly fine sandy loam, 8 to 12 percent slopes	2, 261	. 6
Cleora fine sandy loam, 1 to 3 percent slopes	2, 110	. 5	Mountainburg stony fine sandy loam, 1 to 12 percent slopes	23, 746	6. 0
Cobbly alluvial land	393	. 1	Mountainburg stony fine sandy loam, 12 to 40 percent slopes	7, 394	1. 9
Dubbs fine sandy loam, 0 to 1 percent slopes	369	. 1	Mountainburg-Rock land association, steep	7, 578	1. 9
Dubbs fine sandy loam, 1 to 3 percent slopes	2, 671	. 7	Muldrow silt loam	636	. 2
Dubbs and Cleora soils	1, 741	. 4	Muskogee silt loam, 1 to 3 percent slopes	670	. 2
Enders gravelly silt loam, 3 to 8 percent slopes, eroded	1, 969	. 5	Muskogee silt loam, 3 to 8 percent slopes	1, 421	. 4
Enders gravelly silt loam, 8 to 20 percent slopes, eroded	2, 626	. 7	Ora fine sandy loam, 3 to 8 percent slopes, eroded	3, 267	. 8
Enders stony fine sandy loam, 12 to 50 percent slopes	1, 143	. 3	Pickwick silt loam, 1 to 3 percent slopes, eroded	5, 717	1. 4
Enders-Mountainburg association, rolling	4, 795	1. 2	Pickwick silt loam, 3 to 8 percent slopes, eroded	7, 964	2. 0
Enders-Mountainburg association, steep	11, 546	2. 9	Rock land	2, 764	. 7
Falkner complex, mounded	4, 296	1. 1	Taft complex, mounded	870	. 2
Falkner silt loam, 0 to 1 percent slopes	2, 617	. 7	Taft silt loam, 0 to 1 percent slopes	3, 992	1. 0
Falkner silt loam, 1 to 3 percent slopes	10, 138	2. 5	Taft silt loam, 1 to 3 percent slopes	3, 298	. 8
Guthrie silt loam	1, 325	. 3	Wing silt loam	168	(1)
Guthrie silt loam, flooded	1, 624	. 4	Gravel pits-rock quarries	64	(1)
Hartsells fine sandy loam, 1 to 3 percent slopes	1, 317	. 3	Strip mines	1, 561	. 4
Hartsells fine sandy loam, 3 to 8 percent slopes	1, 232	. 3	Open water	7, 012	1. 8
Holston soils, rolling	1, 317	. 3			
Holston soils, steep	3, 535	. 9	Total	398, 720	100. 0
Holston-Enders association, rolling	1, 597	. 4			
Holston-Enders association, steep	3, 161	. 8			
Holston-Enders association, very steep	2, 810	. 7			
Iberia clay	1, 498	. 4			
Leadvale complex, mounded	805	. 2			

[1] Less than 0.05 percent.

mapping unit, it is necessary to read the description of the soil series as well as the description of the mapping unit.

Part of this county was mapped at medium intensity, and part at low intensity. Thus, two kinds of mapping units are described.

Following the name of each mapping unit is a symbol in parentheses. This symbol identifies the mapping unit on the soil map and indicates whether it is a medium-intensity or a low-intensity unit. For a soil within the medium-intensity survey, the symbol consists of a combination of capital and lower-case letters (AgC). It includes a number if the soil is eroded. For a soil within the low-intensity survey, the symbol consists of capital letters (AMD). The low-intensity mapping units are of more varied composition than the others, but the composition has been controlled well enough that interpretations for expected uses can be made.

Listed at the end of the description of each mapping unit are the capability unit, woodland group, wildlife group, and, where applicable, the range site in which each soil has been placed. The woodland groups are described in table 7 in the section "Use of the Soils for Woodland." The wildlife groups are described in table 8 in the section "Use of the Soils for Wildlife." The page on which each capability unit and each range site is described can be found readily by referring to the "Guide to Mapping Units" at the back of this survey.

Many terms used in the soil descriptions and other sections of the survey are defined in the Glossary.

Allen Series

The Allen series consists of well-drained, moderately permeable soils that developed in colluvium from acid sandstone and shale. These soils are on foot slopes and benches, chiefly in the Boston Mountains. The slope range is 3 to 65 percent.

Representative profile of Allen gravelly fine sandy loam, 8 to 12 percent slopes, in a moist pasture; SE¼NE¼NE¼ sec. 26, T. 11 N., R. 27 W.:

Ap—0 to 4 inches, dark-brown (10YR 3/3) gravelly fine sandy loam; moderate, fine, granular structure; friable; many fine roots; few fine pores; numerous worm casts; about 20 percent sandstone gravel; slightly acid; clear, smooth boundary. 3 to 6 inches thick.

B1—4 to 13 inches, brown (7.5YR 4/4) gravelly loam; weak, fine, subangular blocky structure; friable; common fine roots; few fine pores; about 15 percent sandstone gravel; medium acid; gradual, smooth boundary. 5 to 12 inches thick.

B21t—13 to 26 inches, yellowish-red (5YR 4/6) gravelly sandy clay loam; moderate, medium, subangular blocky structure; friable; common medium clay films; common fine roots; few fine pores; few worm casts; about 20 percent sandstone gravel; very strongly acid; gradual, smooth boundary.

B22t—26 to 42 inches, red (2.5YR 4/6) gravelly sandy clay loam; moderate, medium, subangular blocky structure; friable; common medium clay films; few fine roots; few fine pores; few worm casts; about 25 percent sandstone gravel; very strongly acid; gradual, wavy boundary. Combined thickness of the B2t horizons is 24 to 48 inches.

B3—42 to 72 inches +, red (2.5YR 4/6) gravelly sandy clay loam; weak, medium, subangular blocky structure; friable; few thin clay films; few fine pores; about 35 percent sandstone gravel; very strongly acid. 0 to 36 inches thick.

The A1 horizon, where present, is ½ inch to 4 inches thick and is dark brown to very dark grayish brown. The A2 horizon, where present, is brown to yellowish-red fine sandy loam or loam 3 to 6 inches thick. The Ap horizon is brown, dark brown, or dark grayish brown. The B1 horizon is reddish-brown, yellowish-red, or brown gravelly or stony loam or sandy clay loam. The B2t horizon is gravelly or stony sandy clay loam or clay loam. It usually has two or more subhorizons that differ chiefly in color, in shades of yellowish red and red. The B3 horizon, where present, is strong brown, yellowish brown, red, or yellowish red, or is mottled with these colors. It is gravelly or stony clay loam, loam, or clay loam. In places the B2t horizon or the B3 horizon rests on an unconforming horizon of strongly acid clay that is mottled red, brown, and gray. The depth to bedrock ranges from 5 to 15 feet. Sandstone gravel and stones make up 15 to 40 percent of the soil mass. The reaction is slightly acid to medium acid in the A horizon and medium acid to very strongly acid in the B horizon.

Allen soils are associated with Hartsells, Holston, Mountainburg, Montevallo, Ora, Linker, and Enders soils. They are deeper over bedrock than any of the associated soils are, except Holston soils. They are redder in the B horizon than Hartsells and Holston soils. They have less clay in the B horizon than Enders soils. They do not have the fragipan that is typical of Ora soils.

Allen gravelly fine sandy loam, 3 to 8 percent slopes (AgC).—This soil is on benches and foot slopes. Most areas are between 5 and 25 acres in size. Included in mapping were eroded spots, stony spots, spots that are less than 10 percent coarse fragments, and spots of Mountainburg, Linker, and Enders soils.

The surface layer of this Allen soil is dark grayish brown, dark brown, or brown and is 4 to 10 inches thick. The subsoil is yellowish-red to red gravelly sandy clay loam or gravelly clay loam 5 to 7 feet thick. The underlying material is sandstone or shale bedrock, or red and gray mottled clay, or material like that of the subsoil. Sandstone gravel and stones make up 15 to 30 percent of the soil mass. The depth to bedrock ranges from 5 to 15 feet or more.

This soil is medium acid to very strongly acid. It is low in natural fertility. The response to lime and fertilizer is good. The root zone is 4 feet or more thick. Permeability is moderate, and the available water capacity is moderate. Runoff is moderate, and the erosion hazard is severe.

This soil is easy to till. It is suited to corn, small grain, hay, and pasture crops, upland oak, shortleaf pine, hickory, and black walnut. Most of the acreage has been cultivated but is now in pasture or hay or is reverting to woodland. (Capability unit IIIe–1, woodland group 4o7, wildlife group 6)

Allen gravelly fine sandy loam, 8 to 12 percent slopes (AgD).—This soil is on benches and foot slopes. Most areas are between 5 and 40 acres in size. Included in mapping were eroded spots, stony spots, and spots of Mountainburg, Linker, and Enders soils.

The surface layer of this Allen soil is dark grayish brown, dark brown, or brown and is 4 to 10 inches thick. The subsoil is yellowish-red or red gravelly clay loam or gravelly sandy clay loam 5 to 7 feet thick. The underlying material is sandstone or shale bedrock, or red and gray mottled clay, or material like that of the subsoil. Sandstone gravel and stones make up 15 to 30 percent of the soil mass. The depth to bedrock is 5 to 15 feet or more.

This soil is medium acid to very strongly acid. It is low in natural fertility. The response to lime and fertilizer is moderate to good. The root zone is 4 feet or more thick. Permeability is moderate, and the available water capacity is moderate. Runoff is moderate, and the erosion hazard is very severe.

This soil is easy to till, but because of the slope, it is not well suited to cultivated crops. It is suited to pasture and hay crops, upland oak, shortleaf pine, hickory, and black walnut. Many areas have been cleared and cultivated, but now most are reverting to woodland. (Capability unit IVe–1, woodland group 4o7, wildlife group 7)

Allen stony fine sandy loam, 8 to 12 percent slopes (AsD).—This soil is on foot slopes, hillsides, and benches. Most areas are between 30 and 150 acres in size. Included in mapping were spots of a soil that is less than 15 percent coarse fragments and spots of Mountainburg, Linker, and Enders soils.

The surface layer of this Allen soil is very dark grayish brown to brown and is 4 to 9 inches thick. The subsoil is yellowish-red or red stony clay loam or stony sandy clay loam 4 to 6 feet thick. The underlying material is sandstone or shale bedrock, or red and gray mottled clay, or material like that of the subsoil. Stones and gravel make up 15 to 40 percent of the soil mass. The depth to bedrock is 5 to 15 feet or more.

This soil is medium acid to very strongly acid. It is low in natural fertility. The root zone is 4 feet or more thick. Permeability is moderate, and the available water capacity is moderate. Runoff is rapid, and the erosion

hazard is very severe. There are enough stones 3 to 18 inches in diameter to interfere with logging and tillage operations, but not enough to make such operations impractical.

Most areas are in native woodland of mixed upland hardwoods and scattered shortleaf pine. The growth of these trees is good. A few small areas are cleared and used for pasture. (Capability unit IVe–2, woodland group 4x8, wildlife group 11)

Allen stony fine sandy loam, 12 to 45 percent slopes (AsE).—This soil is mainly on foot slopes and on long narrow mountainside benches. Most areas are between 20 and 100 acres in size. Included in mapping were spots where the surface is gravelly and spots of Mountainburg, Linker, and Enders soils.

The surface layer of this Allen soil is very dark grayish brown to brown and is 4 to 9 inches thick. The subsoil is yellowish-red or red stony clay loam or stony sandy clay loam 4 to 6 feet thick. The underlying material is sandstone or shale bedrock, or red and gray mottled clay, or material like that of the subsoil. Stones and gravel make up 20 to 40 percent of the soil mass. The depth to bedrock is 5 to 10 feet or more.

This soil is medium acid to very strongly acid. It is low in natural fertility. The root zone is 4 feet or more thick. Permeability is moderate, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is very severe. There are enough stones 3 to 18 inches in diameter to interfere with logging operations, but not enough to make such operations impractical.

Practically all of the acreage is native woodland of mixed hardwoods and scattered shortleaf pine. The growth of these trees is good. (Capability unit VIIe–1, woodland group 4x8, wildlife group 11)

Allen soils, gently rolling (ADB).—These soils are on benches, foot slopes, and stream terraces, mainly in the Boston Mountains. Most areas are between 20 and 200 acres in size. The slope range is 3 to 8 percent. Included in mapping, and making up about 10 percent of most mapped areas, are spots of Leadvale, Holston, Mountainburg, and Enders soils.

The surface layer of these Allen soils is dark grayish-brown, dark-brown, or brown fine sandy loam, stony fine sandy loam, or gravelly fine sandy loam 4 to 15 inches thick. In some areas there is only one of these textures, but in others, all three. The subsoil is yellowish-red to red sandy clay loam or clay loam 4 to 6 feet thick. It is stony or gravelly in most places. The depth to bedrock is 5 to 15 feet.

These soils are medium acid to very strongly acid. They are low in natural fertility. Roots easily penetrate to a depth of 4 feet or more. Permeability is moderate, and the available water capacity is moderate. Runoff is moderate, and the erosion hazard is severe.

Most areas are forested with upland oak, hickory, and shortleaf pine. The growth of these trees is moderate. Red oak, white oak, and shortleaf pine are the species preferred for planting. (Capability unit IIIe–1, woodland group 4o7, wildlife group 6)

Allen soils, rolling (ADD).—These soils are on benches and foot slopes, mainly in the Boston Mountains. Most areas are between 20 and 400 acres in size. The slope range is 8 to 20 percent. Included in mapping, and making up about 15 percent of each mapped area, are spots of Leadvale, Holston, Mountainburg, and Enders soils.

The surface layer of the Allen soils is dark grayish-brown, dark-brown, or brown fine sandy loam, stony fine sandy loam, or gravelly fine sandy loam 4 to 15 inches thick. In some areas there is only one of these textures; but in others, there are two or all three. Generally the stony and gravelly soils are also the steeper ones. The subsoil is yellowish-red to red sandy clay loam or clay loam. It is stony or gravelly in most places and is 4 to 6 feet thick. The depth to bedrock is 5 to 15 feet.

These soils are medium acid to very strongly acid. They are low in natural fertility. Roots easily penetrate to a depth of 4 feet or more. Permeability is moderate, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is severe.

Most areas are forested with upland hardwoods. A few are in shortleaf pine. The growth of upland oak, hickory, and shortleaf pine is moderate. Red oak, white oak, and shortleaf pine are the species preferred for planting. (Capability unit VIe–1, woodland group 4r9, wildlife group 7)

Allen soils, steep (ADE).—These soils are on benches, foot slopes, and mountainsides, mainly in the Boston Mountains. Most areas are between 20 and 400 acres in size. The slope range is 20 to 45 percent. Included in mapping, and making up about 15 percent of most mapped areas, are spots of Enders, Holston, and Mountainburg soils, and Rock land.

The surface layer of these Allen soils is dark grayish-brown, dark-brown, or brown stony fine sandy loam or gravelly fine sandy loam 4 to 15 inches thick. In some areas there is only one of these textures, but in others there are both. The subsoil is yellowish-red or red sandy clay loam or clay loam. It is stony or gravelly in most places and is 4 to 6 feet thick. The depth to bedrock is 5 to 15 feet.

These soils are medium acid to very strongly acid. They are low in natural fertility. Roots easily penetrate to a depth of 4 feet or more. Permeability is moderate, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is very severe.

Most areas are forested with upland hardwoods. A few are in shortleaf pine. The growth of upland oak, hickory, and shortleaf pine is moderate. Steep slopes interfere with the operation of machinery used in harvesting timber. (Capability unit VIIe–1, woodland group 4r9, wildlife group 7)

Allen-Enders association, rolling (AED).—This association is 65 percent Allen soils and 22 percent Enders soils. Both of these soils are gravelly and stony and are well drained. The areas are 20 to more than 300 acres in size. The slope range is 8 to 20 percent. Included in mapping, and making up about 15 percent of each mapped area, were spots of Leadvale, Montevallo, and Mountainburg soils, and areas of Rock land.

Allen soils are on foot slopes, hillsides, and benches. They have a surface layer of very dark grayish-brown to brown, gravelly or stony fine sandy loam 4 to 12 inches thick. The subsoil is yellowish-red or red, gravelly or stony clay loam or sandy clay loam 4 to 6 feet thick. The depth to bedrock is 5 to 15 feet.

Allen soils are medium acid to very strongly acid. They are low in natural fertility. Roots penetrate to a depth of 4 feet or more. Permeability is moderate, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is severe.

The growth of upland oak, elm, hickory, and shortleaf pine is moderate on Allen soils. Red oak, white oak, and shortleaf pine are the species preferred for planting.

Enders soils are on mountainsides. They have a surface layer of very dark grayish-brown to brown, stony or gravelly fine sandy loam. The subsoil is red to yellowish-red silty clay or clay mottled with gray and brown in the lower part. It is about 30 to 54 inches thick. The depth to shale bedrock is 4 to 8 feet.

Enders soils are strongly acid to very strongly acid. They are low in natural fertility. The root zone is 3 to 6 feet thick. Roots penetrate slowly through the clay subsoil. Permeability is very slow, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is severe.

The growth of oak, elm, hickory, and other upland hardwoods is slow on Enders soils, and that of shortleaf pine is moderate.

Nearly all of this association is forested with upland hardwoods. A few areas are in shortleaf pine. (Allen soils: capability unit VIe–1, woodland group 4r9, wildlife group 7. Enders soils: capability unit VIe–2, woodland group 4r3, wildlife group 7)

Allen-Enders association, steep (AEE).—This association is about 55 percent Allen soils and 30 percent Enders soils. Both of these soils are gravelly and stony and well drained. The areas are between 20 and 500 acres in size. The slope range is 20 to 40 percent. Included in mapping, and making up about 15 percent of most mapped areas, are spots of Leadvale, Montevallo, and Mountainburg soils, and Rock land.

Allen soils occur on foot slopes, hillsides, and benches. They have a surface layer of very dark grayish-brown to brown gravelly or stony fine sandy loam 4 to 12 inches thick. Their subsoil is yellowish-red or red gravelly or stony clay loam or sandy clay loam 4 to 6 feet thick. The depth to bedrock is 5 to 15 feet.

Allen soils are medium acid to very strongly acid. They are low in natural fertility. The root zone is 4 feet or more thick. Permeability is moderate, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is very severe.

The growth of upland oak, elm, hickory, and pine is moderate on Allen soils. Red oak, white oak, and shortleaf pine are the species preferred for planting.

Enders soils are on mountainsides. They have a surface layer of very dark grayish-brown to brown, stony or gravelly fine sandy loam. The subsoil is red to yellowish-red silty clay or clay mottled with gray and brown in the lower part. It is about 30 to 54 inches thick. The depth to shale bedrock is 4 to 8 feet.

Enders soils are strongly acid to very strongly acid. They are low in natural fertility. The root zone is 3 to 6 feet thick. Roots penetrate the clay subsoil slowly. Permeability is very slow, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is very severe.

The growth of oak, elm, hickory, and other upland hardwoods is slow on Enders soils, and that of shortleaf pine is moderate.

Nearly all of this association is forested with upland hardwoods. Small areas are in shortleaf pine. Steep slopes interfere with the operation of machinery used in harvesting timber. (Allen soils: capability unit VIIe–1, woodland group 4r9, wildlife group 7. Enders soils: capability unit VIIs–1, woodland group 4r3, wildlife group 7)

Allen-Enders association, very steep (AEF).—This association is about 60 percent Allen soils and 25 percent Enders soils. Both of these soils are gravelly and stony and well drained. The areas are between 20 and 600 acres in size. The slope range is 40 to 65 percent. Included in mapping, and making up about 15 percent of most mapped areas, are spots of Leadvale, Montevallo, and Mountainburg soils, and Rock land.

Allen soils occur on foot slopes, hillsides, and benches. They have a surface layer of very dark grayish-brown to brown gravelly or stony fine sandy loam 4 to 12 inches thick. The subsoil is yellowish-red or red gravelly or stony clay loam or sandy clay loam 4 to 6 feet thick. The depth to bedrock is 5 to 6 feet or more.

Allen soils are medium acid to very strongly acid. They are low in natural fertility. The root zone is 4 feet or more thick. Permeability is moderate, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is very severe.

The growth of upland oak, elm, hickory, and pine is moderate on Allen soils. Red oak, white oak, and shortleaf pine are the species preferred for planting.

Enders soils are on mountainsides. They have a surface layer of very dark grayish-brown to brown stony or gravelly fine sandy loam. The subsoil is red to yellowish-red silty clay or clay mottled with gray and brown in the lower part. It is about 30 to 54 inches thick. The depth to shale bedrock is 4 to 8 feet.

Enders soils are strongly acid to very strongly acid. They are low in natural fertility. The root zone is 3 to 6 feet thick. Roots penetrate the clay subsoil slowly. Permeability is very slow, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is very severe.

The growth of oak, elm, hickory, and other upland hardwoods is slow on Enders soils, and that of shortleaf pine is moderate.

Nearly all of this association is forested with upland hardwoods. Small areas are in shortleaf pine. Steep slopes interfere with the operation of machinery used in harvesting timber. (Allen soils: capability unit VIIe–1, woodland group 4r9, wildlife group 8. Enders soils: capability unit VIIs–1, woodland group 4r3, wildlife group 8)

Allen-Mountainburg association, rolling (AMD).—This association is about 45 percent Allen soils, 20 percent Linker soils, and 20 percent Mountainburg soils. Allen soils are deep, Linker soils are moderately deep, and Mountainburg soils are shallow. All are gravelly and stony and well drained. This association is mainly in the Boston Mountains. The areas are between 40 and 300 acres in size. The slope range is 8 to 20 percent. Included in mapping, and making up about 15 percent of most

mapped areas, were spots of Enders, Leadvale, and Montevallo soils, spots that are free of gravel or stones, and spots of Rock land.

Allen soils are on foot slopes, benches, and mountainsides. They have a surface layer of very dark grayish-brown to brown gravelly or stony fine sandy loam 4 to 15 inches thick. The subsoil is yellowish-red or red gravelly or stony clay loam or sandy clay loam 4 to 6 feet thick. The depth to bedrock is 5 to 15 feet.

Allen soils are medium acid to very strongly acid. They are low in natural fertility. The root zone is 4 feet or more thick. Roots penetrate easily. Permeability is moderate, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is very severe.

The growth of oak, elm, hickory, and other upland hardwoods and of shortleaf pine is moderate on these soils. Red oak, white oak, and shortleaf pine are the species preferred for planting.

Linker soils are mostly on ridgetops. They have a surface layer of grayish-brown, brown, or very dark grayish-brown gravelly or stony fine sandy loam 3 to 10 inches thick. Their subsoil is yellowish-red or red sandy clay loam or clay loam 17 to 30 inches thick. The depth to bedrock is 20 to 40 inches.

Linker soils are strongly acid to very strongly acid. They are low in natural fertility. The root zone is 20 to 40 inches thick. Roots penetrate easily. Permeability is moderate, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is very severe.

The growth of upland hardwoods and shortleaf pine is moderate on Linker soils.

Mountainburg soils are mostly on ridgetops and mountaintops. The surface layer is dark grayish-brown, dark-brown, or brown stony fine sandy loam 4 to 9 inches thick. The subsoil is reddish-brown or yellowish-red stony fine sandy loam or stony loam 6 to 15 inches thick. The depth to bedrock is 12 to 20 inches.

Mountainburg soils are strongly acid to very strongly acid. They are low in natural fertility. The root zone is 12 to 20 inches thick. Roots penetrate easily. Permeability is rapid, and the available water capacity is low. Runoff is rapid, and the erosion hazard is very severe. Droughtiness is a limitation.

The growth of upland hardwoods and shortleaf pine is slow on Mountainburg soils.

Nearly all of this association is forested with upland hardwoods. A few areas are in shortleaf pine. (Allen and Linker soils: capability unit VIe–1, woodland group 4r9, wildlife group 7. Mountainburg soils: capability unit VIIs–2, woodland group 5d3, wildlife group 10, Sandstone Ridge range site)

Allen-Mountainburg association, steep (AME).—This association is about 55 percent Allen soils and 30 percent Mountainburg soils. Allen soils are deep, and Mountainburg soils are shallow. Both are gravelly or stony and are well drained. This association is mainly in the Boston Mountains. The areas are between 40 and 500 acres in size. The slope range is 20 to 40 percent. Included in mapping, and making up about 15 percent of most mapped areas, are spots of Enders, Holston, and Leadvale soils, spots where the surface layer is not gravelly or stony, and spots of Rock land.

Allen soils are on foot slopes, hillsides, and benches. They have a surface layer of very dark grayish-brown to brown gravelly or stony fine sandy loam 4 to 12 inches thick. Their subsoil is yellowish-red or red gravelly or stony clay loam or sandy clay loam 4 to 6 feet thick. The depth to bedrock is 5 to 10 feet or more.

Allen soils are medium acid to very strongly acid. They are low in natural fertility. The root zone is 4 feet or more thick. Roots penetrate easily. Permeability is moderate, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is very severe.

The growth of upland oak, elm, hickory, and shortleaf pine is moderate on Allen soils. Red oak, white oak, and shortleaf pine are the species preferred for planting.

Mountainburg soils occur as long, narrow, steep areas on ridgetops and mountainsides. The surface layer is dark grayish-brown, dark-brown, or brown stony fine sandy loam. It is 4 to 9 inches thick. The subsoil is reddish-brown or yellowish-red stony fine sandy loam or stony loam 6 to 15 inches thick. The depth to bedrock is 12 to 20 inches.

Mountainburg soils are strongly acid to very strongly acid. They are low in natural fertility. The root zone is 12 to 20 inches thick. Roots penetrate easily. Permeability is rapid, and the available water capacity is low. Runoff is rapid, and the erosion hazard is very severe. Droughtiness is a limitation.

The growth of upland hardwoods and shortleaf pine is slow on Mountainburg soils.

Nearly all of this association is forested with upland hardwoods. A few areas are in shortleaf pine. Steep slopes interfere with the operation of machinery used in harvesting timber. (Allen soils: capability unit VIIe–1, woodland group 4r9, wildlife group 7. Mountainburg soils: capability unit VIIs–2, woodland group 5d3, wildlife group 10, Sandstone Ridge range site)

Allen-Holston association, very steep (AMF).—This association is about 35 percent Allen soils, 35 percent Holston soils, and 20 percent Mountainburg soils. Allen and Holston soils are deep, and Mountainburg soils are shallow. All are stony and well drained. This association is mainly in the Boston Mountains. The areas are between 30 and 700 acres in size. The slope range is 40 to 65 percent. Included in mapping, and making up about 10 percent of each area, were spots of Leadvale, Enders, and Montevallo soils, and Rock land.

Allen soils are on foot slopes, hillsides, and narrow benches. They have a surface layer of very dark grayish-brown to brown gravelly or stony fine sandy loam 4 to 12 inches thick. The subsoil is yellowish-red or red stony clay loam or sandy clay loam 4 to 6 feet thick. The depth to bedrock is 5 to 10 feet or more.

Allen soils are medium acid to very strongly acid. They are low in natural fertility. The root zone is 4 feet or more thick. Roots penetrate easily. Permeability is moderate, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is very severe.

The growth of upland oak, elm, hickory, and shortleaf pine is moderate on Allen soils. Red oak, white oak, and shortleaf pine are the species preferred for planting.

Holston soils are on foot slopes, hillsides, and benches. They have a surface layer of very dark grayish-brown

to yellowish-brown stony loam or stony fine sandy loam 5 to 10 inches thick. The subsoil is yellowish-brown or strong-brown stony sandy clay loam or clay loam 3 to 6 feet thick. In places there is a layer of mottled, plastic silty clay or clay below the subsoil. The depth to bedrock is 5 to 15 feet.

Holston soils are strongly acid to very strongly acid. They are low in natural fertility. The root zone is 4 feet or more thick. Roots easily penetrate the subsoil. Permeability is moderate, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is very severe.

The growth of upland oak, hickory, sugar maple, shortleaf pine, and ash is moderate on these soils.

Mountainburg soils occur as long, narrow, steep areas on ridgetops and mountainsides. Their surface layer is dark grayish-brown, dark-brown, or brown stony fine sandy loam 4 to 9 inches thick. Their subsoil is reddish-brown or yellowish-red stony fine sandy loam or stony loam 6 to 15 inches thick. The depth to bedrock is 12 to 20 inches.

Mountainburg soils are strongly acid to very strongly acid. Natural fertility is low. The root zone is 12 to 20 inches thick. Roots penetrate easily. Permeability is rapid, and the available water capacity is low. Runoff is rapid, and the erosion hazard is very severe. Droughtiness is a limitation.

The growth of upland hardwoods and shortleaf pine is slow on Mountainburg soils.

Nearly all of this association is forested with upland hardwoods. A few areas are in shortleaf pine. Steep slopes interfere with the operation of machinery used in harvesting timber. (Allen and Holston soils: capability unit VIIe–1, woodland group 4r9, wildlife group 8. Mountainburg soils: capability unit VIIs–2, woodland group 5d3, wildlife group 10, Sandstone Ridge range site)

Bruno Series

The Bruno series consists of excessively drained, rapidly permeable, sandy soils on natural levees along the Arkansas River and the larger upland streams. The slope range is 0 to 2 percent.

Representative profile of Bruno loamy fine sand in a moist, idle field; NW¼NE¼SW¼ sec. 2, T. 9 N., R. 27 W.

Ap—0 to 6 inches, brown (10YR 5/3) loamy fine sand; single grain; loose; common fine and medium roots; neutral; abrupt, smooth boundary. 5 to 8 inches thick.

A1—6 to 11 inches, dark-brown (10YR 4/3) loamy fine sand; single grain; very friable to loose; common bedding planes; few roots; few fine pores; slightly acid; clear, smooth boundary. 0 to 8 inches thick.

C1—11 to 36 inches, brown (7.5YR 5/4) loamy fine sand; single grain; very friable to loose; common bedding planes; thin lenses of silt loam and very fine sandy loam; few fine pores; medium acid; clear, smooth boundary. 18 to 36 inches thick.

C2—36 to 57 inches, light-brown (7.5YR 6/4) fine sand; single grain; loose; common bedding planes; thin lenses of silt loam and very fine sandy loam; medium acid; clear, smooth boundary. 0 to 30 inches thick.

C3—57 to 65 inches, brown (7.5YR 5/4) loamy very fine sand; single grain; very friable; common bedding planes; medium acid; clear, smooth boundary. 8 to 30 inches thick.

C4—65 to 75 inches +, reddish-brown (5YR 4/4) fine sandy loam; massive; very friable; common bedding planes; slightly acid. 10 to 48 inches thick.

The Ap horizon ranges from light yellowish brown (10YR 6/4) to very dark grayish brown (10YR 3/2), and the C horizon from light brown to brown, yellowish brown, and reddish brown. The C horizon ranges from loamy fine sand or fine sand to loamy sand and fine sandy loam in texture and has thin lenses of silt loam and very fine sandy loam to a depth of 48 inches or more. Below this depth, it ranges from loamy sand to silt loam and has thin lenses of loamy sand to clay. Locally, the C horizon overlies unconforming beds of gravel or clay at a depth of 5 to 8 feet. The reaction is slightly acid to neutral in the A horizon, and medium acid to neutral in the C horizon.

Bruno soils are associated mainly with Caspiana, Cleora, Dubbs, Iuka, and Morganfield soils. They are coarser textured than these soils, and they do not have a B horizon, which Caspiana and Dubbs soils do have.

Bruno loamy fine sand (Br).—This soil occurs as long, narrow bands near stream channels. Most areas are between 5 and 60 acres in size. Spots of Caspiana, Iuka, and Morganfield soils are included in some mapped areas.

The surface layer of this Bruno soil is light brown to dark brown. The underlying material consists of brown, light-brown, yellowish-brown, or reddish-brown loamy fine sand and thin layers of silt loam or fine sandy loam.

This soil is neutral to medium acid. It is low in natural fertility. The root zone is more than 4 feet thick. Roots and water penetrate easily. The available water capacity is low. Runoff is slow.

Occasional overflow and scouring are hazards. Most areas have been cleared and are used for small grain, corn, grain sorghum, soybeans, hay, and pasture. (Capability unit IIIs–1, woodland group 2s8, wildlife group 3)

Bruno and Iuka soils (Bu).—These nearly level soils occur as narrow areas on bottom land along small streams. They are excessively drained and moderately well drained. Either one of these soils, or both, may occur in any given area of the mapping unit. Spots of Cleora and Dubbs soils are included in some areas.

Bruno soils have a surface layer of brown to light yellowish-brown loamy sand. The underlying material consists of yellowish-brown, brown, or reddish-brown loamy fine sand and thin lenses of silt loam or sandy loam.

Bruno soils are medium acid to slightly acid. They are low in natural fertility. Permeability is rapid, and the available water capacity is low.

Iuka soils have a surface layer of dark-brown or brown loamy fine sand or fine sandy loam. The underlying material consists of sandy loam, fine sandy loam, or loam, and thin layers of loamy sand. The upper part of this material is dark yellowish brown or yellowish brown and is mottled in places. The lower part is mottled brown and gray.

Iuka soils are medium acid to very strongly acid. They are moderate to low in natural fertility. Permeability is moderate, and the available water capacity is moderate. The water table is high part of the time.

These soils can be used for pasture and woodland. They are subject to frequent overflow in winter and occasional overflow in other seasons. Scouring is a hazard during overflow. (Bruno soils: capability unit Vw–1,

woodland group 2s8, wildlife group 3. Iuka soils: capability unit Vw–1, woodland group 2s8, wildlife group 1)

Caspiana Series

The Caspiana series consists of well-drained soils that developed in loamy alluvium on the flood plain of the Arkansas River. Some of these soils are level; some are undulating and have alternate ridges and swales. The slope range is 0 to 2 percent.

Representative profile of Caspiana silt loam in a moist, cultivated field; SE¼SE¼SE¼ sec. 35, T. 9 N., R. 26 W.:

Ap—0 to 7 inches, very dark grayish-brown (10YR 3/2) silt loam; weak, fine, granular structure; very friable; many fine roots; few fine pores; medium acid; abrupt, smooth boundary. 5 to 9 inches thick.

B21t—7 to 14 inches, very dark brown (10YR 2/2) clay loam; moderate, medium, subangular blocky structure; firm; common, thin, patchy clay films; common fine roots; many fine pores; medium acid; gradual, wavy boundary.

B22t—14 to 40 inches, dark reddish-brown (5YR 3/3) clay loam; moderate, medium, subangular blocky structure; friable; common, thin, patchy clay films; few fine roots; common fine pores; few worm casts; medium acid; gradual, smooth boundary.

B23t—40 to 52 inches, red (2.5YR 4/6) silty clay loam; moderate, medium, subangular blocky structure; friable; common, thin, patchy clay films; common fine pores; medium acid; gradual, smooth boundary. Combined thickness of Bt horizons is 30 to 50 inches.

B3—52 to 72 inches +, reddish-brown (5YR 4/4) loam; weak, medium, subangular blocky structure; friable; common fine pores; slightly acid. 18 to 30 inches thick.

The Ap horizon is very dark brown, very dark grayish brown, or dark brown. The B1 horizon, where present, is very dark brown, very dark grayish-brown, or dark-brown silt loam or loam 4 to 9 inches thick. The B2t horizon is very dark brown, red, or dark reddish-brown loam, silty clay loam, or clay loam. The B3 horizon is dark-brown, dark reddish-brown, or reddish-brown loam, clay loam, sandy clay loam, or silty clay loam. In some places there is a C horizon of stratified loamy sand, fine sandy loam, and clay loam. The depth to the C horizon ranges from about 4 to more than 6 feet. The reaction is medium acid to slightly acid in the A and B horizons and medium acid to neutral in the C horizon.

Caspiana soils are associated with Bruno, Morganfield, Moreland, Muldrow, and Iberia soils. They are finer textured and have a darker colored surface horizon than Bruno soils. They are browner below the surface layer and are better drained than the somewhat poorly drained Muldrow soils and the poorly drained Iberia soils. They are finer textured and have a darker colored surface horizon than Morganfield soils, which lack a B horizon. They are coarser textured than Moreland, Muldrow, and Iberia soils, all of which are clayey below the surface layer.

Caspiana silt loam (Ca).—This soil is on the higher parts of the flood plain along the Arkansas River. Most areas are between 10 and 200 acres in size. A few spots of Bruno, Morganfield, and Muldrow soils are included in some mapped areas.

The surface layer of this Caspiana soil is very dark grayish brown or dark brown. The subsoil is very dark brown, very dark grayish-brown, dark-brown, dark reddish-brown, or red silty clay loam or clay loam.

This soil is medium acid to slightly acid. It is high in natural fertility. The response to fertilizer is good. The root zone is more than 4 feet thick. Roots and water penetrate easily. The available water capacity is moderate. Runoff is slow.

All areas are cultivated. The crops are cotton, corn, soybeans, small grain, and alfalfa. (Capability unit I–1, woodland group 2o7, wildlife group 1)

Cleora Series

The Cleora series consists of well-drained, moderately permeable soils derived from alluvium washed from loamy uplands. These soils are on flood plains of the Mulberry River, White Oak Creek, and other upland streams. Most areas are subject to occasional overflow. The slope range is 0 to 3 percent.

Representative profile of Cleora fine sandy loam, 1 to 3 percent slopes, in a moist woodland; SE¼NE¼NW¼ sec. 25, T. 12 N., R. 27 W.:

O1—½ inch to 0, forest litter.

A1—0 to 4 inches, very dark grayish-brown (10YR 3/2) fine sandy loam; weak, medium, granular structure; friable; many roots; many fine pores; medium acid; clear, smooth boundary. 2 to 5 inches thick.

C1—4 to 9 inches, dark-brown (10YR 3/3) fine sandy loam; weak, fine, subangular blocky structure; friable; many roots; common pores and worm tunnels, some filled with very dark grayish-brown sandy loam; strongly acid; gradual, wavy boundary. 4 to 12 inches thick.

C2—9 to 17 inches, dark-brown (10YR 3/3) sandy loam; weak, medium, subangular blocky structure; very friable; common roots; common fine and medium pores; strongly acid; clear, wavy boundary. 0 to 24 inches thick.

C3—17 to 30 inches, dark yellowish-brown (10YR 3/4) fine sandy loam; weak, medium, subangular blocky structure; friable; few roots; few pores; strongly acid; gradual, wavy boundary. 10 to 30 inches thick.

C4—30 to 46 inches, dark-brown (10YR 3/3) sandy loam; massive with faint bedding planes; friable; small amount of sandstone gravel; strongly acid; clear, wavy boundary. 6 to 24 inches thick.

C5—46 to 72 inches +, dark-brown (10YR 3/3) gravelly sandy loam; weak, medium, subangular blocky structure; friable; few roots; about 15 percent rounded sandstone gravel ½ inch to 2 inches in diameter; strongly acid. 1 foot to several feet thick.

The A1 horizon is very dark grayish brown to dark brown. The Ap horizon, where present, is 4 to 8 inches thick. It is very dark grayish brown to dark brown. The C horizon consists of weakly stratified sandy sediments. The strata range in texture from loam to gravelly sandy loam and have no regular sequence. The C horizon either has weak subangular blocky structure or is massive. Dominantly its color ranges from dark brown to dark yellowish brown, but locally individual strata are yellowish brown, strong brown, or reddish brown. In many places there is an underlying horizon of gravel. The depth to gravelly strata ranges from 2½ to more than 6 feet. The reaction is slightly acid to strongly acid in the A horizon and medium acid to strongly acid in the C horizon.

Cleora soils are associated with Bruno, Dubbs, Guthrie, Iuka, and Pickwick soils. They are browner below the surface layer, better drained, and coarser textured than Guthrie soils, which have a B horizon and a fragipan. They are coarser textured and have a darker colored surface horizon than Dubbs and Pickwick soils, which have a B horizon. They have a darker colored surface layer than Bruno and Iuka soils, but they are less sandy than Bruno soils and are less mottled in the C horizon than Iuka soils.

Cleora fine sandy loam, 0 to 1 percent slopes (CrA).—This soil occurs as strips near the channels of upland

streams. Most areas are between 5 and 40 acres in size. Spots of Bruno, Dubbs, and Iuka soils and areas of Cobbly alluvial land are included in some mapped areas.

The surface layer of this Cleora soil is very dark grayish brown or dark brown. The underlying material is dark yellowish-brown or dark-brown, stratified loam to gravelly fine sandy loam. Gravel beds are at a depth of 2½ to more than 6 feet.

This soil is medium acid to strongly acid. It is moderate in natural fertility. The response to lime and fertilizer is good. The root zone is 4 feet or more thick. Roots and water penetrate easily. The available water capacity is moderate. Runoff is slow.

This soil is easy to till, and it can be worked throughout a wide range of moisture content. It is subject to occasional overflow in winter and early in spring but is not limited in production or in the choice of crops. It is suited to hay, pasture, and small grain and to corn, grain sorghum, and other row crops. Sprinkling is a suitable method of irrigation. (Capability unit I–1, woodland group 2o7, wildlife group 1)

Cleora fine sandy loam, 1 to 3 percent slopes (CrB).—This soil occurs as strips near the channels of upland streams. Most areas are between 5 and 30 acres in size. Level spots, gravelly spots, and spots of Dubbs soils are included in some mapped areas.

The surface layer of this Cleora soil is very dark grayish brown or dark brown. The underlying material is dark yellowish-brown or dark-brown, stratified loam to gravelly fine sandy loam. Gravel beds are at a depth of 2½ to more than 6 feet.

This soil is medium acid to strongly acid. It is moderate in natural fertility. The response to lime and fertilizer is good. The root zone is 4 feet or more thick. Roots and water penetrate easily. The available water capacity is moderate. Runoff is medium, and the erosion hazard is slight.

This soil is easy to till, and it can be worked throughout a wide range of moisture content. It is subject to occasional overflow in winter and early in spring, and to scouring during periods of overflow, but is not limited in production or in the choice of crops. It is suited to hay, pasture, small grain, corn, and grain sorghum. Sprinkling is a suitable method of irrigation. (Capability unit IIe–4, woodland group 2o7, wildlife group 1)

Cobbly Alluvial Land

Cobbly alluvial land (Cy) occurs as strips 50 to 150 feet wide on bottom land near the heads of small, rapidly flowing, upland streams. It is subject to frequent overflow. The areas are between 5 and 15 acres in size. The slope range is 0 to 3 percent. Most mapped areas include small gravel bars or cobblestone bars and spots of Cleora and Dubbs soils.

The material in this land type is a loose mass of rounded gravel, cobblestones, and shale fragments, and brown, friable sandy loam or loam. The coarse fragments make up 80 to 90 percent of the mass. The depth to bedrock is 4 to 10 feet or more.

The material is medium acid to very strongly acid. The available water capacity is low. Runoff is slow, and internal drainage is excessive.

Because of the high cobblestone content and the hazard of frequent overflow, Cobbly alluvial land is not used for cultivated crops, and only spots are used for pasture. Sycamore, black walnut, and cottonwood trees grow well. (Capability unit VIIs–4, woodland group 3x9, wildlife group 11)

Dubbs Series

The Dubbs series consists of well-drained, moderately permeable soils that developed in loamy alluvium. These soils are on low terraces on the flood plains of the larger upland streams. Some are subject to occasional overflow, chiefly in winter. The slope range is 0 to 3 percent.

Representative profile of Dubbs fine sandy loam, 1 to 3 percent slopes, in a moist pasture; NW¼NE¼SE¼ sec. 29, T. 12 N., R. 26 W.:

Ap1—0 to 3 inches, brown (10YR 4/3) fine sandy loam; weak, medium, granular structure; friable; many fine roots; slightly acid; clear, smooth boundary.

Ap2—3 to 7 inches, brown (10YR 4/3) fine sandy loam; weak, fine, subangular blocky structure; friable; common roots; slightly acid; abrupt, smooth boundary. Combined thickness of Ap horizons is 4 to 10 inches.

B21t—7 to 27 inches, brown (10YR 4/3) clay loam; moderate, fine, subangular blocky structure; friable; few patchy clay films on peds and lining pores; few roots; common pores; medium acid; gradual, smooth boundary.

B22t—27 to 37 inches, dark yellowish-brown (10YR 3/4) loam; weak, fine, subangular blocky structure; friable; patchy clay films on ped faces and in pores; few roots; common pores; medium acid; gradual, wavy boundary. Combined thickness of B2t horizons is 18 to 40 inches.

B3—37 to 44 inches, dark yellowish-brown (10YR 3/4) fine sandy loam; weak, fine, subangular blocky structure; friable; few, thin, patchy clay films on peds; medium acid; abrupt, wavy boundary, 0 to 20 inches thick.

C—44 to 72 inches +, about 60 percent rounded sandstone gravel and cobblestones in a brown sandy loam matrix; massive; friable; medium acid. 1 foot to several feet thick.

The A1 horizon, where present, is dark grayish brown, dark brown, or brown and is 3 to 5 inches thick. The Ap horizon is dark brown or brown. In places there is a B1 horizon 4 to 12 inches thick. It is brown fine sandy loam or loam. The B2t horizon is dark brown, dark yellowish brown, reddish brown, or brown. Its texture is sandy clay loam, clay loam, loam, or heavy silt loam. In some places there is a C horizon of massive fine sandy loam or loam. It is brown or dark yellowish brown. The gravel content of the C horizon ranges from 10 to 90 percent. The reaction is medium acid to neutral in the A horizon, and medium acid to strongly acid in the B and C horizons.

Dubbs soils are associated with Bruno, Cleora, Guthrie, Leadvale, and Pickwick soils. They have a B horizon, which Bruno and Cleora soils lack. They are finer textured than Bruno soils and are finer textured below the surface layer than Cleora soils. They have a more weakly developed, thinner B horizon than Pickwick and Leadvale soils, are less red than Pickwick soils, and lack the fragipan that is characteristic of Leadvale soils. They are browner and better drained than Guthrie soils.

Dubbs fine sandy loam, 0 to 1 percent slopes (DbA).—This soil occurs as strips on low terraces along the Mulberry River, White Oak Creek, and other large streams. Most areas are between 5 and 60 acres in size. A few spots where the surface layer is gravelly or cobbly and

a few spots of Cleora, Pickwick, Bruno, and Iuka soils are included in some mapped areas.

The surface layer of this Dubbs soil is dark brown, brown, or dark grayish brown and is 4 to 10 inches thick. The subsoil, about 2 to 4 feet thick, is brown, dark-brown, dark yellowish-brown, or reddish-brown sandy clay loam, heavy silt loam, loam, or clay loam. The gravel content is less than 15 percent. Below the subsoil is yellowish-brown to reddish-brown fine sandy loam, or gravelly fine sandy loam, or a gravel bed several feet thick.

This soil is medium acid to strongly acid. It is moderate in natural fertility. The root zone is 4 feet or more thick. Roots and water penetrate easily. The available water capacity is moderate. Runoff is slow.

This soil is well suited to small grain, corn, and soybeans, but most of the acreage is used for pasture and meadow. Some areas are subject to occasional overflow in winter and early in spring. Sprinkling is a suitable method of irrigation. (Capability unit I–1, woodland group 3o7, wildlife group 1)

Dubbs fine sandy loam, 1 to 3 percent slopes (DbB).—This soil is on low terraces along the larger streams. Most areas are between 5 and 120 acres in size. Spots where the surface layer is gravelly or cobbly and spots of Cleora and Pickwick soils are included in some mapped areas.

The surface layer of this Dubbs soil is brown, dark brown, or dark grayish brown and is 4 to 8 inches thick. The subsoil is dark yellowish-brown to reddish-brown clay loam, loam, or sandy clay loam. Below the subsoil is fine sandy loam, or gravelly fine sandy loam, or a gravel bed several feet thick.

This soil is strongly acid to medium acid. It is moderate in natural fertility. The root zone is 4 feet or more thick. Roots and water penetrate easily. The available water capacity is moderate. Runoff is slow to moderate, and the erosion hazard is moderate.

This soil is easy to till, and it can be worked throughout a wide range of moisture content. Hay, pasture, small grain, corn, and grain sorghum are suitable crops. Sprinkling is a suitable method of irrigation. (Capability unit IIe–4, woodland group 3o7, wildlife group 1)

Dubbs and Cleora soils (DC).—This unit is about 40 percent Dubbs soils, 25 percent Pickwick soils, and 20 percent Cleora soils. All of these soils are deep and well drained. Any one, or two, or all three may occur in any one mapped area. These soils occur on terraces and flood plains along small streams, mainly in the Boston Mountains. The areas are between 15 and 250 acres in size. The slope range is 1 to 8 percent. Included in mapping, and making up about 15 percent of most mapped areas, are spots of Leadvale soils, gravel bars, and spots where the surface is cobbly or gravelly.

Dubbs soils are on the low terraces. They have a surface layer of brown, dark-brown, or dark grayish-brown fine sandy loam that is 4 to 8 inches thick. Their subsoil is dark yellowish-brown to reddish-brown clay loam, loam, or sandy clay loam. Below the subsoil is fine sandy loam, or gravelly fine sandy loam, or a gravel bed several feet thick.

Dubbs soils are strongly acid to medium acid. They are moderate in natural fertility. The root zone is 4 feet or more thick. Roots penetrate easily. Permeability is moderate, and the available water capacity is moderate. Runoff is slow to moderate, and the erosion hazard is slight to severe.

Pickwick soils are on the higher terraces along small streams. They have a surface layer of brown, dark-brown, dark yellowish-brown, or dark grayish-brown loam that is 4 to 10 inches thick. The subsoil is red or yellowish-red loam, clay loam, or silty clay loam 30 to 60 inches thick. The depth to bedrock is more than 6 feet.

Pickwick soils are strongly acid to very strongly acid. They are moderate in natural fertility. The root zone is 3 feet or more thick. Roots penetrate easily. Permeability is moderate, and the available water capacity is high. Runoff is slow to moderate, and the erosion hazard is slight to severe.

Cleora soils are on the flood plains. They have a surface layer of dark-brown or very dark grayish-brown fine sandy loam that is 4 to 8 inches thick. The underlying material is dark yellowish-brown to dark-brown, stratified loam to gravelly fine sandy loam. There are gravel beds at a depth of 2½ to 6 feet.

Cleora soils are medium acid to strongly acid. They are moderate in natural fertility. The root zone is 4 feet or more thick. Roots penetrate easily. Permeability is moderate, and the available water capacity is moderate. Runoff is slow to moderate, and the erosion hazard is slight to severe. The overflow hazard is moderate to severe.

Almost all of this unit is forested with hardwoods. A few areas are in shortleaf pine. (Dubbs soils: capability unit IIe–4, woodland group 3o7, wildlife group 1. Pickwick soils: capability unit IIIe–1, woodland group 3o7, wildlife group 1. Cleora soils: capability unit IIe–4, woodland group 2o7, wildlife group 1)

Enders Series

The Enders series consists of well-drained soils that have a very slowly permeable, clayey subsoil. These soils developed in residuum derived from acid shale. They have a thin surface layer of loamy material, presumably colluvium from higher lying soils. They are on hillsides and mountainsides. The slope range is 3 to 65 percent.

Representative profile of Enders gravelly fine sandy loam in an area of Allen-Enders association, rolling, in a moist, wooded area; NW¼NW¼SW¼ sec. 2, T. 12 N., R. 26 W.:

O1—1½ inches to 0, leaf and twig litter.

A1—0 to 5 inches, dark-brown (7.5YR 4/4) gravelly fine sandy loam; weak, medium, granular structure; very friable; many roots; medium acid; clear, wavy boundary. 2 to 6 inches thick.

B1—5 to 8 inches, yellowish-red (5YR 4/6) silty clay loam; weak, medium, subangular blocky structure; friable; common roots; strongly acid; gradual, wavy boundary. 3 to 8 inches thick.

B21t—8 to 22 inches, yellowish-red (5YR 4/8) silty clay; strong, fine, angular blocky structure; firm, sticky, plastic; continuous thick clay films on most peds; common roots; few, fine, tubular pores; very strongly acid; gradual, wavy boundary. 10 to 18 inches thick.

B22t—22 to 28 inches, red (2.5YR 4/8) clay; common, medium and coarse, prominent, light yellowish-brown (10YR 6/4) mottles; moderate, coarse, subangular blocky structure that readily breaks into strong, fine, angular blocky peds; firm, sticky, plastic; clay films thick and continuous on most peds; few, fine, tubular pores; common roots; very strongly acid; gradual, wavy boundary. 0 to 12 inches thick.

B23t—28 to 39 inches, light-gray (5Y 7/1) clay; many, fine and medium, prominent, reddish-brown (5YR 4/4) mottles; strong, fine, angular blocky structure; firm, sticky, plastic; continuous thick clay films on most peds; few fine roots; few, fine, tubular pores; few shale fragments; few, medium, hard concretions; very strongly acid; gradual, wavy boundary. 10 to 24 inches thick.

B3—39 to 46 inches, light-gray (5Y 7/1) silty clay; many, medium and coarse, prominent, dark reddish-brown (2.5YR 3/4) mottles; platy fragments that break to weak, fine, angular blocky structure; firm, sticky, plastic; few fine roots; common fragments of soft shale; few humus streaks; few, medium, hard concretions; very strongly acid; diffuse boundary. 6 to 24 inches thick.

C—46 to 62 inches, light-gray (5Y 7/1), partly weathered clay shale; common, coarse, prominent, dusky-red (10R 3/4) mottles, mainly on cleavage faces; platy; shale fragments easily crushed; shale interiors yellow; extremely acid; gradual, wavy boundary. 10 to 20 inches thick.

R—62 inches, thinly bedded acid shale.

The texture of the surface layer is gravelly or stony fine sandy loam or silt loam. The A1 horizon ranges from very dark grayish brown to dark brown. The Ap horizon, where present, is dark grayish brown to brown and is 3 to 7 inches thick. In spots it is a mixture of material from the A and B1 horizons. The A2 horizon, where present, is brown to grayish brown and is up to 6 inches thick. The B1 horizon is strong-brown, brown, or yellowish-red silty clay loam or sandy clay loam. The B2t horizon, which has two or more subhorizons, is silty clay or clay and is 24 to 48 inches thick. The subhorizons differ mainly in color. The uppermost part is yellowish red to red. The middle part is similar but has reddish-yellow to light yellowish-brown mottles. The lowermost part is variegated red, brown, and gray. It contains clay films but otherwise is much like the B3 horizon. The B3 horizon is variegated or mottled red, yellowish red, brown, gray, and light gray, or it is dominantly gray and is mottled with red, yellowish red, dark reddish brown, and brown. The depth to the C horizon is 40 to 60 inches. The C horizon is 6 to 18 inches thick and is clay, dominantly gray, mottled with red, yellowish red, strong brown, and yellowish brown. The content of sandstone gravel or stone ranges from 15 to 60 percent in the A and B1 horizons and from 0 to 15 percent in the B2t horizon. The depth to shale bedrock is 4 to 8 feet. The reaction is medium acid to very strongly acid in the A horizon and strongly acid to very strongly acid in the B horizon.

Enders soils are associated with Allen, Holston, Hartsells, Mountainburg, Linker, Ora, and Montevallo soils. They have more clay in the B horizon and are more prominently mottled than the associated soils. They are deeper over bedrock than Mountainburg and Montevallo soils.

Enders gravelly silt loam, 3 to 8 percent slopes, eroded (EnC2).—This soil occurs as short slopes. The areas are commonly between 5 and 40 acres in size. There are common rills and a few shallow gullies. Stony spots and spots of Montevallo, Linker, and Allen soils are included in some mapped areas.

The surface layer of this Enders soil is very dark grayish brown to brown. In spots the plow layer is a mixture of material from the surface layer and the subsoil. The subsoil is yellowish-red to red silty clay or clay mottled with gray and brown in the lower part. It is about 30 to 54 inches thick. The gravel content is 15 to 40 percent in the surface layer and 0 to 15 percent in the subsoil. The depth to shale bedrock is 4 to 8 feet.

This soil is strongly acid to very strongly acid. It is low in natural fertility. The response to lime and fertilizer is moderate. The root zone is 3 to 6 feet thick. Roots penetrate the heavy clay subsoil slowly. Permeability is very slow, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is very severe.

This soil is somewhat difficult to till because of the gravel content. It is well suited to hay and pasture crops. It is poorly suited to oak, elm, hickory, and other upland hardwoods and is moderately well suited to shortleaf pine (fig. 7). Most of the acreage has been cleared and cultivated but is now in pasture or hay or is reverting to hardwoods. (Capability unit IVe–4, woodland group 4o1, wildlife group 9)

Enders gravelly silt loam, 8 to 20 percent slopes, eroded (EnD2).—This soil occurs as short slopes. The areas are between 5 and 30 acres in size. There are common rills and a few shallow gullies. Stony spots and spots of Montevallo and Allen soils are included in some mapped areas.

The surface layer of this Enders soil is very dark grayish brown to brown. In spots the plow layer is a mixture of material from the surface layer and the subsoil. The subsoil is red to yellowish-red silty clay or clay mottled with gray and brown in the lower part. It is about 30 to 54 inches thick. The gravel content is 15 to 50 percent in the surface layer and 0 to 15 percent in the subsoil. The depth to shale bedrock is 4 to 8 feet.

This soil is strongly acid to very strongly acid. It is low in natural fertility. The response to lime and fertilizer is fair. The root zone is 3 to 6 feet thick. Roots penetrate the heavy clay subsoil slowly. Permeability is very slow, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is severe.

Pasture and hay crops can be grown. Growth is slow for oak, elm, hickory, and other upland hardwoods and moderate for shortleaf pine. Much of the acreage has been cleared and some of it has been cultivated, but now all of it is in pasture or hay or is reverting to hardwoods. (Capability unit VIe–2, woodland group 4r3, wildlife group 7)

Enders stony fine sandy loam, 12 to 50 percent slopes (EsF).—Areas of this soil are between 5 and 80 acres in size. Spots of Allen and Montevallo soils are included in some mapped areas.

The surface layer of this Enders soil is very dark grayish brown to brown. The subsoil is red to yellowish-red silty clay or clay mottled with gray and brown in the lower part. It is about 30 to 54 inches thick. The sandstone content is 20 to 60 percent in the surface layer and 0 to 15 percent in the subsoil. The depth to shale bedrock is 4 to 7 feet.

This soil is strongly acid to very strongly acid. It is low in natural fertility. The root zone is 3 to 6 feet thick. Roots penetrate the heavy clay subsoil slowly. Permea-

Figure 7.—Stand of naturally seeded shortleaf pine trees on Enders gravelly silt loam, 3 to 8 percent slopes, eroded.

bility is very slow, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is very severe.

Most of the acreage is in native woodland of mixed upland hardwoods. The growth of these trees is slow. That of shortleaf pine is fair. There are enough stones 6 to 18 inches in diameter to interfere with logging and mowing operations. (Capability unit VIIs–1, woodland group 5x3, wildlife group 11)

Enders-Mountainburg association, rolling (EMD).—This association is about 40 percent Enders soils, 20 percent Montevallo soils, and 20 percent Mountainburg soils. Enders soils are moderately deep and well drained, Montevallo soils are shallow and somewhat excessively drained, and Mountainburg soils are shallow and well drained. All are stony or gravelly. The areas are between 20 and 300 acres in size and are mainly in the Boston Mountains. The slope range is 8 to 20 percent. Included in mapping, and making up about 20 percent of most mapped areas, are spots of Leadvale, Allen, and Holston soils.

Enders soils have a surface layer of very dark grayish-brown to brown stony or gravelly fine sandy loam. The subsoil is yellowish-red or red silty clay or clay mottled with gray and brown in the lower part. It is about 30 to 54 inches thick. The depth to shale bedrock is 4 to 8 feet.

Enders soils are strongly acid to very strongly acid. They are low in natural fertility. The root zone is 3 to 6 feet thick. Roots penetrate the clay subsoil slowly. Permeability is very slow, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is very severe.

The growth of oak, elm, hickory, and other upland hardwoods is slow on Enders soils. That of shortleaf pine is moderate.

Montevallo soils have a surface layer of very dark grayish-brown, dark grayish-brown, or dark-brown gravelly or stony silt loam 3 to 10 inches thick. The subsoil is brown, strong-brown, or yellowish-brown gravelly or stony silt loam, silty clay loam, or silty clay. The depth to bedrock is 10 to 20 inches. The sandstone content is 15 to 35 percent in the surface layer. Shale fragments make up 35 to 60 percent of the subsoil.

Mountainburg soils occur as long, narrow, steep areas on ridgetops and mountainsides. They have a surface layer of dark grayish-brown, dark-brown, or brown gravelly or stony fine sandy loam 3 to 9 inches thick. The subsoil is reddish-brown or yellowish-red gravelly or stony fine sandy loam or loam. The depth to bedrock is 12 to 20 inches. Stones and gravel make up 15 to 40 percent of the soil mass.

Montevallo and Mountainburg soils are strongly acid to very strongly acid. They are low in natural fertility. The root zone is 10 to 20 inches thick. The available water capacity is low. Runoff is rapid, and the erosion hazard is very severe.

Droughtiness is a limitation on Montevallo and Mountainburg soils. Growth is slow for upland hardwoods and shortleaf pine.

Nearly all of this association is forested with upland hardwoods. Small areas are in shortleaf pine. (Enders

soils: capability unit VIIs–1, woodland group 4r3, wildlife group 7. Montevallo soils: capability unit VIIs–2, woodland group 5d3, wildlife group 10, Shale Break range site. Mountainburg soils: capability unit VIIs–2, woodland group 5d3, wildlife group 10, Sandstone Ridge range site)

Enders-Mountainburg association, steep (EME).—This association is about 30 percent Enders soils, 25 percent Montevallo soils, and 25 percent Mountainburg soils. Enders soils are moderately deep and well drained, Montevallo soils are shallow and somewhat excessively drained, and Mountainburg soils are shallow and well drained. All are stony or gravelly. All occur in most mapped areas. The areas are between 20 and 300 acres in size and are mainly on mountainsides in the Boston Mountains. The slope range is 20 to 40 percent. Included in mapping, and making up about 20 percent of most mapped areas, are spots of Leadvale, Allen, and Holston soils and Rock land.

Enders soils have a surface layer of very dark grayish-brown to brown stony or gravelly fine sandy loam. The subsoil is yellowish-red or red silty clay or clay mottled with gray and brown in the lower part. It is about 30 to 54 inches thick. The depth to shale bedrock is 4 to 8 feet.

Enders soils are strongly acid to very strongly acid. They are low in natural fertility. The root zone is 3 to 6 feet thick. Roots penetrate the clay subsoil slowly. Permeability is very slow, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is very severe.

The growth of oak, elm, hickory, and other upland hardwoods is slow on Enders soils. That of shortleaf pine is moderate.

Montevallo soils have a surface layer of very dark grayish-brown, dark grayish-brown, or dark-brown gravelly or stony silt loam 3 to 10 inches thick. The subsoil is brown, strong-brown, or yellowish-brown gravelly or stony silt loam, silty clay loam, or silty clay. The depth to bedrock is 10 to 20 inches. The sandstone content is 15 to 35 percent in the surface layer. Shale fragments make up 35 to 60 percent of the subsoil.

Mountainburg soils occur as long, narrow, steep areas on ridgetops and mountainsides. They have a surface layer of dark grayish-brown, dark-brown, or brown gravelly or stony fine sandy loam 3 to 9 inches thick. The subsoil is reddish-brown or yellowish-red gravelly or stony fine sandy loam or loam. The depth to bedrock is 12 to 20 inches.

Montevallo and Mountainburg soils are strongly acid to very strongly acid. They are low in natural fertility. The root zone is 10 to 20 inches thick. The available water capacity is low. Runoff is rapid, and the erosion hazard is very severe.

Droughtiness is a limitation on Montevallo and Mountainburg soils. Growth is slow for upland hardwoods and shortleaf pine.

Nearly all of this association is forested with upland hardwoods. Small areas are in shortleaf pine. Steep slopes interfere with the use of machinery in harvesting timber. (Enders soils: capability unit VIIs–1, woodland group 4r3, wildlife group 7. Montevallo soils: capability unit VIIs–2, woodland group 5d3, wildlife group 10, Shale Break range site. Mountainburg soils: capability unit VIIs–2, woodland group 5d3, wildlife group 10, Sandstone Ridge range site)

Falkner Series

The Falkner series consists of somewhat poorly drained, very slowly permeable soils that developed in residuum derived from acid shale. These soils are in broad valleys in the southern part of the county. The slope range is dominantly 0 to 3 percent. Some areas are mounded.

Representative profile of Falkner silt loam, 1 to 3 percent slopes, in a moist meadow; NE¼NE¼NE¼ sec. 13, T. 8 N., R. 28 W.:

Ap—0 to 7 inches, dark-brown (10YR 4/3) silt loam; weak, medium, granular structure; very friable; many roots; few fine pores; few, fine, hard, dark-colored concretions; strongly acid; clear, smooth boundary. 5 to 9 inches thick.

B1—7 to 12 inches, strong-brown (7.5YR 5/8) silty clay loam; common, medium, distinct, grayish-brown mottles and few, medium, faint, yellowish-brown mottles; weak, fine, subangular blocky structure; friable; few roots; common fine pores; few, fine, hard, dark-colored concretions; strongly acid; gradual, wavy boundary. 4 to 12 inches thick.

B21t—12 to 19 inches, grayish-brown (10YR 5/2) silty clay loam; many, coarse, distinct, light yellowish-brown (10YR 6/4) mottles; weak, medium, subangular blocky structure; firm; common medium clay films and bridges; few roots; common fine pores; few, fine and medium, hard, dark-colored concretions; strongly acid; gradual, wavy boundary. 4 to 10 inches thick.

B22t—19 to 32 inches, light brownish-gray (10YR 6/2) silty clay; common, medium, prominent, red mottles; moderate, medium, subangular blocky structure; firm, plastic; common medium clay films; few roots; few fine pores; common, fine and medium, hard, dark-colored concretions; very strongly acid; gradual, irregular boundary. 12 to 24 inches thick.

B23t—32 to 68 inches, light brownish-gray (10YR 6/2) clay; many, medium, prominent, red mottles; strong, medium, subangular blocky structure; firm, plastic; common medium clay films; few fine pores; many, medium, hard, black concretions; strongly acid. 24 to 60 inches thick.

R—68 inches +, thinly laminated shale; strongly acid.

The Ap horizon is dark brown, dark grayish brown, or dark yellowish brown. The A2 horizon, where present, is 4 to 9 inches thick. It is brown, yellowish-brown, or pale-brown silt loam and has few to common, grayish-brown mottles. The B1 horizon is yellowish-brown, brown, strong-brown, grayish-brown, or dark grayish-brown silt loam or silty clay loam. The B21t horizon is grayish-brown silty clay loam that has brown or light yellowish-brown mottles or is variegated gray and brown. The B22t and B23t horizons are gray, grayish-brown, or light brownish-gray silty clay or clay that has common, yellowish-brown and red mottles or is variegated gray, grayish brown, and yellowish brown. The depth to bedrock ranges from 5 to more than 8 feet. The reaction is medium acid to strongly acid in the A horizon and strongly acid to very strongly acid in the B horizon.

Falkner soils are associated with Leadvale, Taft, and Wing soils. They have a finer textured B horizon than Leadvale and Taft soils, which have a fragipan. They do not have the high sodium content in the B horizon that is typical of Wing soils.

Falkner complex, mounded (Fc).—This complex occurs mainly as level or depressed areas in broad valleys in the

southern part of the county. Most areas are between 10 and 80 acres in size. Rounded mounds make up 15 to 35 percent of each area. They are 30 to 80 feet in diameter, 3 to 5 feet high, and 20 to 100 feet apart. Spots of Taft and Wing soils are included in some mapped areas.

The surface layer in the areas between mounds is dark-brown, dark grayish-brown, or dark yellowish-brown silt loam 5 to 12 inches thick. The upper part of the subsoil is grayish-brown, brown, yellowish-brown, or dark grayish-brown silt loam or silty clay loam 8 to 22 inches thick. The lower part is gray, grayish-brown, or light brownish-gray silty clay or clay that has common, yellowish-brown or red mottles or is variegated gray, grayish brown, and yellowish brown. It is 3 to 6 feet thick.

The surface layer in the mounds is dark-brown, dark grayish-brown, or dark yellowish-brown silt loam 10 to 24 inches thick. The subsoil is brown or yellowish-brown silt loam or silty clay loam. The depth to bedrock is 5 to more than 8 feet.

This complex is strongly acid to very strongly acid. It is moderate to low in natural fertility. The response to lime and fertilizer is good. The root zone is 4 feet or more thick. Roots penetrate the clay subsoil slowly. Permeability is very slow, and the available water capacity is moderate. Runoff is slow, and wetness is a very severe limitation.

If adequately drained, this complex is suitable for hay, pasture, and small grain. The mounds interfere somewhat with tillage and mowing operations. (Capability unit IVw–1, woodland group 5w8, wildlife group 4, Loamy Prairie range site)

Falkner silt loam, 0 to 1 percent slopes (FlA).—This soil is in broad valleys in the southern part of the county. Most areas are between 10 and 160 acres in size. A few mounds and spots of Leadvale, Taft, and Wing soils are included in some mapped areas.

The surface layer of this Falkner soil is dark brown, dark grayish brown, or dark yellowish brown and is 5 to 12 inches thick. The upper part of the subsoil is yellowish-brown, grayish-brown, brown, dark grayish-brown, or strong-brown silt loam or silty clay loam 8 to 22 inches thick. The lower part is gray, grayish-brown, or light brownish-gray silty clay or clay that has common, yellowish-brown or red mottles or is variegated gray, grayish brown, and yellowish brown. It is 3 to 6 feet thick. The depth to bedrock is 5 to more than 8 feet.

This soil is strongly acid to very strongly acid. It is moderate to low in natural fertility. The response to lime and fertilizer is good. The root zone is 4 feet or more thick. Roots penetrate the clay subsoil slowly. Permeability is very slow, and the available water capacity is moderate. Runoff is slow, and wetness is a severe limitation.

Most areas are used for pasture, meadow (fig. 8), and small grain. Some are cultivated to corn, soybeans, and grain sorghum. Drainage is needed. (Capability unit IIIw–1, woodland group 5w8, wildlife group 4, Loamy Prairie range site)

Falkner silt loam, 1 to 3 percent slopes (FlB).—This soil is in broad valleys in the southern part of the county. Most areas are between 10 and 200 acres in size. Spots of Leadvale, Taft, and Wing soils are included in some mapped areas.

The surface layer of this Falkner soil is dark brown, dark grayish brown, or dark yellowish brown and is 5 to 12 inches thick. The upper part of the subsoil is yellowish-brown, grayish-brown, brown, dark grayish-brown, or strong-brown silt loam or silty clay loam 8 to 22 inches thick. The lower part is gray, grayish-brown, or light brownish-gray silty clay or clay that has common, yellowish-brown or red mottles or is variegated gray, grayish brown, and yellowish brown. It is 3 to 6 feet thick. The depth to bedrock is 5 to more than 8 feet.

This soil is strongly acid to very strongly acid. It is moderate to low in natural fertility. The response to lime and fertilizer is good. The root zone is 4 feet or more thick. Roots penetrate the clay subsoil slowly. Permeability is very slow, and the available water capacity is moderate. Runoff is slow to moderate. Erosion is a moderate hazard, and wetness is a severe limitation.

Most areas are used for pasture, meadow, and small grain. Some are cultivated to corn, soybeans, and grain sorghum. Drainage is needed. (Capability unit IIIw–1, woodland group 5w8, wildlife group 4, Loamy Prairie range site)

Guthrie Series

The Guthrie series consists of level or depressed, poorly drained, very slowly permeable soils that developed in old alluvium washed from acid, loamy soils on uplands. These soils occupy stream terraces and flood plains.

Representative profile of Guthrie silt loam in a moist pasture; NE¼NW¼NW¼ sec. 26, T. 9 N., R. 26 W.:

Ap1—0 to 3 inches, very dark grayish-brown (10YR 3/2) silt loam; few, fine, faint, dark-brown mottles; weak, fine, granular structure; friable; many fine roots; few fine pores; medium acid; clear, smooth boundary. 3 to 6 inches thick.

Ap2—3 to 7 inches, variegated dark-gray (10YR 4/1) and dark-brown (10YR 4/3) silt loam; moderate, medium, granular structure; friable; many fine roots; common fine pores; strongly acid; clear, smooth boundary. 0 to 5 inches thick.

B1g—7 to 11 inches, variegated dark-gray (10YR 4/1) and dark-brown (10YR 4/3) loam; weak, medium, subangular blocky structure; friable; common fine roots; common fine pores; few, fine, dark-brown concretions; very strongly acid; clear, smooth boundary. 3 to 7 inches thick.

B2tg—11 to 17 inches, grayish-brown (10YR 5/2) silty clay loam; common, fine, distinct, dark-brown mottles; weak, medium, subangular blocky structure; friable; common, thin, patchy clay films; common fine roots; common fine pores; very strongly acid; clear, smooth boundary, 5 to 10 inches thick.

Bx1g—17 to 32 inches, gray (10YR 6/1) silty clay loam; common, fine, distinct, dark-brown mottles; gray silt coatings along cleavage planes; weak, medium, subangular blocky structure; firm, brittle; many medium clay films; few fine roots along cleavage planes; common fine pores; common, fine, dark-brown concretions; very strongly acid; gradual, wavy boundary.

Bx2g—32 to 52 inches, gray (10YR 5/1) silty clay loam; many, medium, distinct, yellowish-brown mottles; light-gray silt coatings along cleavage planes; weak, medium, subangular blocky structure; firm, brittle; many medium clay films; few fine roots along cleavage planes; common fine pores; common, medium.

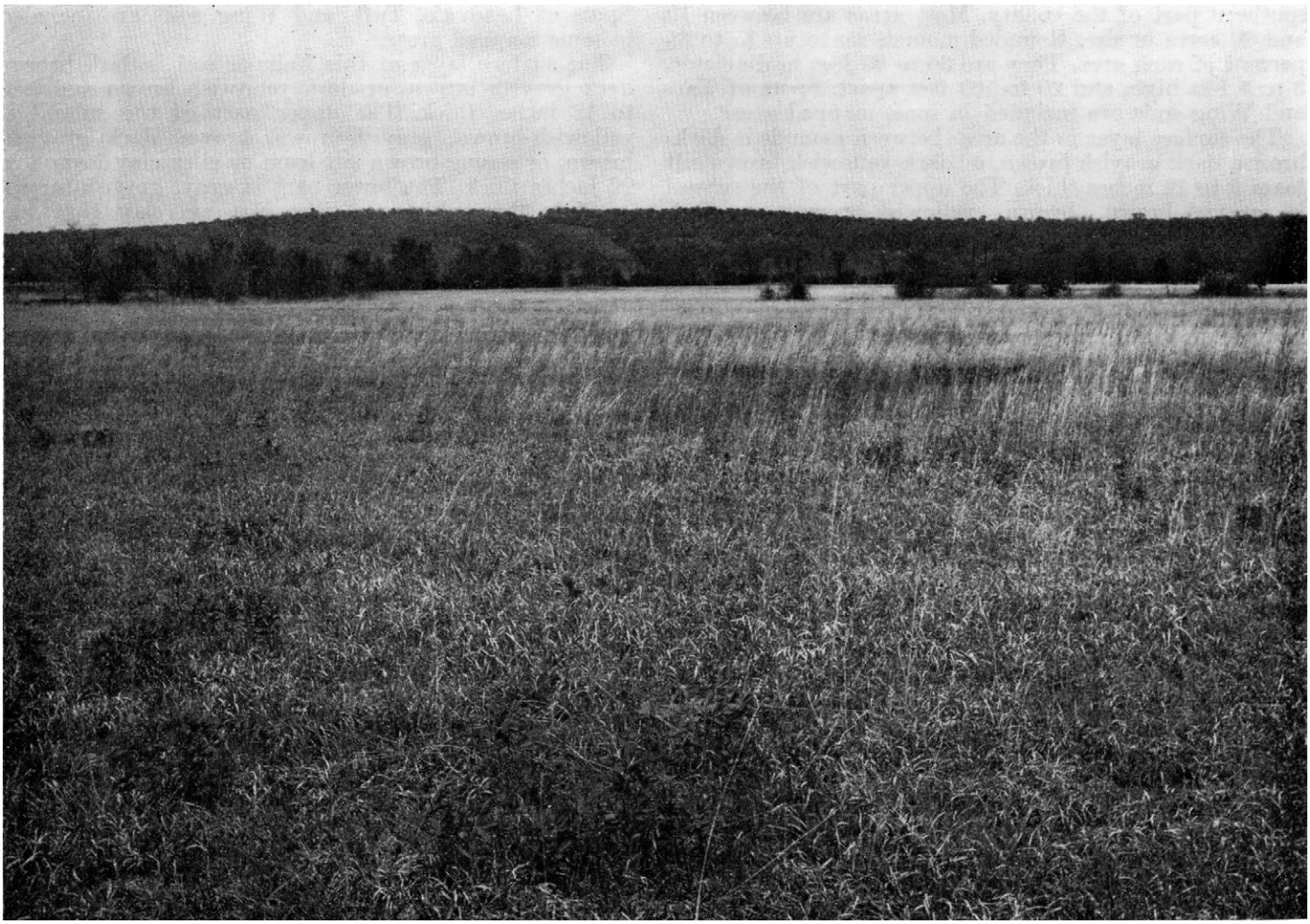

Figure 8.—Native bluestem meadow on Falkner silt loam, 0 to 1 percent slopes.

dark-brown concretions; very strongly acid; gradual, smooth boundary. The combined thickness of the Bx horizons is 25 to 45 inches.

IICg—52 to 72 inches, variegated light-gray (N 7/0) and yellowish-brown (10YR 5/8) silty clay; massive; 30 percent shale fragments; very strongly acid. 10 to 36 inches thick.

The A1 horizon, or the Ap1 horizon, is 1 to 3 inches thick, is very dark gray, dark gray, very dark grayish brown, or dark grayish brown, and has few to common, gray or dark-brown mottles. The A2 horizon, where present, is 4 to 7 inches thick, is gray or grayish brown, and has common to many, brown mottles. The B1 horizon is gray, dark-gray, dark-brown, grayish-brown, or light brownish-gray silt loam, loam, or light silty clay loam that has common to many mottles. The B2tg horizon is gray, grayish-brown, or light brownish-gray silty clay loam or clay loam that has common to many, brown or dark-brown mottles. The Bx horizon is gray, grayish-brown, or light brownish-gray silty clay loam or clay loam that has common to many, dark-brown and yellowish-brown mottles. The IICg horizon is gray, light-gray, or yellowish-brown silty clay loam or silty clay. The depth to the fragipan, or the Bx horizon, ranges from 12 to 20 inches. The reaction is slightly acid to strongly acid in the A horizon and strongly acid to very strongly acid in the B horizon.

Guthrie soils are associated with Cleora, Dubbs, Leadvale, Taft, and Wing soils. They are grayer below the surface layer and are more poorly drained than these soils. They differ from Cleora, Dubbs, and Wing soils in having a fragipan, and they are finer textured than Cleora and Dubbs soils. They lack the high sodium content in the B horizon that is characteristic of Wing soils.

Guthrie silt loam (Gt).—This soil occurs as level or somewhat depressed areas on stream terraces. Most areas are between 5 and 60 acres in size. A few mounded areas and spots of Leadvale and Taft soils are included in some mapped areas.

The surface layer of this Guthrie soil is very dark gray, dark gray, very dark grayish brown, or dark grayish brown and is mottled with gray or brown. It is 3 to 11 inches thick. The upper part of the subsoil is gray, grayish-brown, or light brownish-gray silty clay loam or clay loam mottled with brown. This layer is 8 to 17 inches thick. The lower part is a firm and brittle fragipan. It is gray, grayish-brown, or light brownish-gray silty clay loam or clay loam mottled with brown. It is 25 to 45 inches thick. Hard and soft, dark-colored concretions are common in the profile.

This soil is slightly acid to strongly acid. It is low in natural fertility. The response to lime and fertilizer is moderate. Roots and water easily penetrate as far down as the fragipan, which retards further penetration. The

available water capacity is moderate. Runoff is very slow, and wetness is a very severe limitation.

This soil stays wet for long periods after rains. Drainage is needed. Most areas are used for hay and pasture. (Capability unit IVw–1, woodland group 5w5, wildlife group 5)

Guthrie silt loam, flooded (Gu).—This soil occurs as level or somewhat depressed areas on flood plains, normally in backwater areas, which are farthest from the stream. Most areas are between 5 and 30 acres in size. Spots of Taft soils are included in some mapped areas.

The surface layer of this Guthrie soil is dark gray, gray, or dark grayish brown and is mottled with brown. It is 4 to 10 inches thick. The upper part of the subsoil is gray silty clay loam or clay loam mottled with brown. This layer is 8 to 17 inches thick. The lower part is a firm and brittle fragipan of gray silty clay loam or clay loam mottled with brown. The pan is 25 to 45 inches thick. Hard and soft, dark-colored concretions are common in the profile.

This soil is slightly acid to strongly acid. It is low in natural fertility. The response to lime and fertilizer is moderate. Roots and water easily penetrate as far down as the fragipan, which retards further penetration. The available water capacity is moderate. Runoff is very slow, and wetness is a very severe limitation. The hazard of flooding is moderate to severe.

This soil stays wet for long periods after rains. Drainage is needed. Most areas are used for pasture and hay. (Capability unit Vw–1, woodland group 5w5, wildlife group 5)

Hartsells Series

The Hartsells series consists of well-drained, moderately permeable soils that developed in residuum derived from acid sandstone and siltstone. These soils are on ridges and mountaintops. The slope range is 1 to 8 percent.

Representative profile of Hartsells fine sandy loam, 3 to 8 percent slopes, in a moist woodland; NW¼NW¼NW¼ sec. 17, T. 11 N., R. 28 W.:

O1—1 inch to 0, loose pine litter.

A1—0 to 2 inches, dark-brown (10YR 3/3) fine sandy loam; weak, fine, granular structure; friable; many fine roots; about 10 percent sandstone fragments; strongly acid; abrupt, wavy boundary. 1 to 4 inches thick.

A2—2 to 5 inches, brown (10YR 5/3) fine sandy loam; many worm tunnels filled with very dark grayish-brown (10YR 3/2) and strong-brown (7.5YR 5/6) fine sandy loam; weak, medium, subangular blocky structure; friable; many fine and medium roots; many fine pores; strongly acid; clear, smooth boundary. 3 to 8 inches thick.

B21t—5 to 12 inches, strong-brown (7.5YR 5/6) sandy clay loam; brown (10YR 5/3) fine sandy loam in worm tunnels; weak, medium, subangular blocky structure; friable; common, thin, patchy clay films on peds; many fine and large roots; common fine pores; very strongly acid; gradual, smooth boundary. 5 to 15 inches thick.

B22t—12 to 18 inches, strong-brown (7.5YR 5/6) clay loam; moderate, medium, subangular blocky structure; friable; common medium clay films on peds; common fine roots; common fine pores; about 3 percent sandstone gravel; very strongly acid; clear, wavy boundary, 4 to 18 inches thick.

B23t—18 to 26 inches, strong-brown (7.5YR 5/6) gravelly clay loam; moderate, medium, subangular blocky structure; friable; common, thin, patchy clay films on peds; few fine and medium roots; few fine pores; about 15 percent sandstone gravel; very strongly acid; abrupt, wavy boundary. 3 to 12 inches thick.

R—26 inches +, sandstone bedrock.

The A1 horizon ranges from very dark grayish brown to dark brown. The A2 horizon ranges from grayish brown to brown. The Bt horizon is yellowish-brown or strong-brown sandy clay loam or clay loam. The depth to bedrock ranges from 20 to 48 inches. The reaction is strongly acid in the A horizon and strongly acid to very strongly acid in the B horizon.

Hartsells soils are associated with Allen, Linker, Mountainburg, and Enders soils. They are browner in the B horizon than these soils, which are dominated by reddish colors. They are not so deep as Allen soils but are deeper than Mountainburg soils, which are less than 20 inches over bedrock. They are coarser textured in the B horizon than Enders soils, which have a clayey B horizon.

Hartsells fine sandy loam, 1 to 3 percent slopes (HaB).—This soil occurs as long areas on hilltops and ridges. Most areas are between 5 and 40 acres in size. Spots of Linker and Mountainburg soils are included in some mapped areas.

The surface layer of this Hartsells soil is very dark grayish brown or dark brown and is 4 to 12 inches thick. The subsoil is strong-brown or yellowish-brown sandy clay loam or clay loam 12 to 36 inches thick. The depth to bedrock is 20 to 48 inches.

This soil is strongly acid to very strongly acid. It is low in natural fertility. The response to lime and fertilizer is good. The root zone is 20 to 48 inches thick, and roots and water penetrate easily. The available water capacity is moderate. Runoff is medium, and the erosion hazard is moderate.

This soil is well suited to row crops, hay, pasture, and small grain. It is moderately well suited to upland oaks, shortleaf pine, black walnut, and black locust. Most areas have been cleared and cultivated but are now in pasture or meadow. Some areas are reforested. (Capability unit IIe–1, woodland group 4o7, wildlife group 6)

Hartsells fine sandy loam, 3 to 8 percent slopes (HaC).—This soil occurs as long, irregular areas on ridges. Most areas are between 5 and 50 acres in size. Spots of Linker and Mountainburg soils are included in some mapped areas.

The surface layer of this Hartsells soil is very dark grayish brown or dark brown and is 4 to 10 inches thick. The subsoil is strong-brown or yellowish-brown sandy clay loam or clay loam 12 to 35 inches thick. The depth to bedrock is 20 to 48 inches.

This soil is strongly acid to very strongly acid. It is low in natural fertility. The response to lime and fertilizer is good. The root zone is 20 to 48 inches thick, and roots and water penetrate easily. The available water capacity is moderate. Runoff is medium, and the erosion hazard is severe.

This soil is well suited to row crops, hay, pasture, and small grain. It is moderately well suited to upland oaks, shortleaf pine, black walnut, and black locust. Most areas have been cleared and cultivated but are now in pasture or meadow. Some areas are reforested. (Capability unit IIIe–1, woodland group 4o7, wildlife group 6)

Holston Series

The Holston series consists of well-drained, moderately permeable soils that developed in colluvium derived from acid sandstone, siltstone, and shale. These soils are in the northern part of the county, in the Boston Mountains. They are in coves and on benches, foot slopes, and mountainsides. The slopes range is 8 to 65 percent.

Representative profile of Holston gravelly loam in an area of Allen-Holston association, very steep, in a moist woodland; NE¼SE¼SE¼, sec. 22, T. 12 N., R. 28 W.:

O1—1 inch to 0, mixed hardwood litter.

A11—0 to 2 inches, very dark grayish-brown (10YR 3/2) gravelly loam; moderate, fine, granular structure; friable; many roots; about 25 percent sandstone gravel; medium acid; abrupt, wavy boundary. 1 to 3 inches thick.

A12—2 to 8 inches, dark yellowish-brown (10YR 4/4) gravelly loam; weak, fine, subangular blocky structure; friable; many roots; common fine pores; about 25 percent sandstone gravel; medium acid; clear, wavy boundary. 3 to 7 inches thick.

B1—8 to 11 inches, dark yellowish-brown (10YR 4/4) gravelly loam; moderate, medium, subangular blocky structure; friable; many roots; many fine pores; about 25 percent sandstone gravel; medium acid; clear, smooth boundary. 3 to 9 inches thick.

B21t—11 to 17 inches, strong-brown (7.5YR 5/6) gravelly clay loam; moderate, medium, subangular blocky structure; friable; common thin clay films; common roots; common fine pores; about 25 percent sandstone gravel; strongly acid; gradual smooth boundary. 6 to 15 inches thick.

B22t—17 to 39 inches, strong-brown (7.5YR 5/6) stony clay loam; moderate, medium, subangular blocky structure; friable; common medium clay films on peds and in pores; common roots; many fine pores; about 25 percent sandstone cobblestones and stones; strongly acid; gradual, smooth boundary. 10 to 24 inches thick.

B23t—39 to 48 inches, strong-brown (7.5YR 5/6) stony clay loam; common, medium, faint, yellowish-brown and brown mottles; moderate, medium, subangular blocky structure; friable; common, thin, patchy clay films on peds and in pores; common roots; common fine pores; about 30 percent sandstone gravel and stones; strongly acid; clear, wavy boundary. 0 to 12 inches thick.

B24t—48 to 75 inches +, yellowish-brown (10YR 5/4) stony clay loam; many, medium, faint, light yellowish-brown and strong-brown mottles and many, medium, distinct, yellowish-red mottles; weak, medium, subangular blocky structure; firm; common thin clay films on peds and in pores; few roots; common fine pores; very strongly acid. 0 to 3 feet thick.

The A1 horizon is very dark grayish-brown, dark-brown, or dark yellowish-brown gravelly or stony loam or fine sandy loam. The B1 horizon is dark-brown, brown, yellowish-brown, or dark yellowish-brown gravelly silt loam, fine sandy loam, or loam. The B2t horizon is yellowish-brown, strong-brown, or brown gravelly or stony sandy clay loam or clay loam. In places the B2t horizon is underlain by a silty clay or clay IIB3 or IIC horizon that is variegated red, brown, and gray. The depth to the IIC horizon is 4 to 7 feet. The depth to bedrock ranges from 5 to 15 feet. Sandstone gravel and stones up to 3 feet or more in diameter make up 10 to 40 percent of the soil mass. The reaction is medium acid to strongly acid in the A horizon and medium acid to very strongly acid in the B horizon.

Holston soils are associated with Allen, Enders, and Ora soils. They are browner in the B horizon than these soils, which are dominated by reddish colors. They lack the fragipan that is characteristic of Ora soils, and they are coarser textured in the B horizon than the Enders soils.

Holston soils, rolling (HLD).—These soils are on foot slopes, benches, and mountainsides, mostly in the Boston Mountains. Most areas are between 20 and 200 acres in size. Most have northern exposure. The slope range is 8 to 20 percent. In about 50 percent of the areas mapped, the surface layer is gravelly fine sandy loam, and in 30 percent, it is stony fine sandy loam. Either one or both of these textures may occur in any one mapped area. Included in mapping, and making up about 20 percent of most mapped areas, were spots of Leadvale, Allen, and Enders soils, and spots where the surface layer is loam.

The surface layer of these Holston soils is very dark grayish brown, dark brown, or dark yellowish brown and is 4 to 10 inches thick. The subsoil is stony or gravelly, yellowish-brown, strong-brown, or brown sandy clay loam or clay loam 3 to 6 feet thick. In places the subsoil is underlain by mottled red and gray, plastic clay. The depth to bedrock is 5 to 15 feet.

These soils are strongly acid to very strongly acid. They are low in natural fertility. The root zone is more than 4 feet thick, and roots penetrate easily. Permeability is moderate, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is severe.

The growth of shortleaf pine and of upland hardwoods, such as white oak, red oak, sugar maple, and ash, is moderate on these soils. Nearly all areas are forested with upland hardwoods. A few are in shortleaf pine. (Capability unit VIe–1, woodland group 4r9, wildlife group 7)

Holston soils, steep (HLE).—These soils are on foot slopes, benches, and mountainsides, mostly in the Boston Mountains. Most areas are between 20 and 300 acres in size. Most have northern exposure. The slope range is 20 to 40 percent. In about 30 percent of the areas mapped, the surface layer is gravelly fine sandy loam, and in 50 percent, it is stony fine sandy loam. Either one or both of these textures occur in any one mapped area. Included in mapping, and making up about 20 percent of most mapped areas, are spots of Leadvale, Allen, and Enders soils.

The surface layer of these Holston soils is very dark grayish brown, brown, or dark yellowish brown and is 4 to 10 inches thick. The subsoil is stony or gravelly, yellowish-brown, strong-brown, or brown sandy clay loam or clay loam 3 to 6 feet thick. In places the subsoil is underlain by mottled red and gray, plastic clay. The depth to bedrock is 5 to 15 feet.

These soils are strongly acid to very strongly acid. They are low in natural fertility. The root zone is more than 4 feet thick, and roots penetrate easily. Permeability is moderate, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is very severe.

The growth of shortleaf pine and of upland hardwoods, such as white oak, red oak, sugar maple, and ash, is moderate on these soils. Nearly all areas are forested with upland hardwoods. A few are in shortleaf pine. Steep slopes interfere with the operation of machinery used in harvesting timber. (Capability unit VIIe–1, woodland group 4r9, wildlife group 7)

Holston-Enders association, rolling (HOD).—This association is mostly in the Boston Mountains. It is about

45 percent Holston soils and 40 percent Enders soils. Both of these soils are deep, stony and gravelly, and well drained. Most areas are between 20 and 300 acres in size. The slope range is 8 to 20 percent. Included in mapping, and making up about 15 percent of each mapped area, are spots of Allen, Leadvale, and Mountainburg soils.

Holston soils are on benches and foot slopes and in coves. They have a surface layer of very dark grayish-brown, dark-brown, or dark yellowish-brown gravelly or stony fine sandy loam 4 to 10 inches thick. The subsoil is stony or gravelly, yellowish-brown, strong-brown, or brown sandy clay loam or clay loam 3 to 6 feet thick. In places the subsoil is underlain by red and gray mottled, plastic clay. The depth to bedrock is 5 to 15 feet.

Holston soils are strongly acid to very strongly acid. They are low in natural fertility. The root zone is more than 4 feet thick, and roots penetrate easily. Permeability is moderate, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is severe.

The growth of shortleaf pine and of upland hardwoods, such as white oak, red oak, sugar maple, and ash, is moderate on Holston soils.

Enders soils have a surface layer of very dark grayish-brown to brown, stony or gravelly fine sandy loam. The subsoil is yellowish-red or red silty clay or clay about 30 to 54 inches thick. The lower part is mottled with gray and brown. The depth to shale bedrock is 4 to 8 feet.

Enders soils are strongly acid to very strongly acid. They are low in natural fertility. The root zone is 3 to 6 feet thick. Roots penetrate the clay subsoil slowly. Permeability is very slow, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is very severe.

The growth of upland hardwoods, such as oak, elm, and hickory, is slow on Enders soils. That of shortleaf pine is moderate.

Nearly all of this association is forested with upland hardwoods. A few areas are in shortleaf pine. (Holston soils: capability unit VIe–1, woodland group 4r9, wildlife group 7. Enders soils: capability unit VIIs–1, woodland group 4r3, wildlife group 7)

Holston-Enders association, steep (HOE).—This association is mostly in the Boston Mountains. It is about 45 percent Holston soils and about 40 percent Enders soils. Both soils are deep, stony and gravelly, and well drained. The areas are between 20 and 300 acres in size. The slope range is 20 to 40 percent. Included in mapping, and making up about 15 percent of each mapped area, are spots of Allen, Leadvale, Montevallo, and Mountainburg soils, and Rock land.

Holston soils are on benches and foot slopes and in coves. They have a surface layer of very dark grayish-brown, dark-brown, or dark yellowish-brown, gravelly or stony fine sandy loam 4 to 10 inches thick. The subsoil is yellowish-brown, strong-brown, or brown, gravelly or stony sandy clay loam or clay loam 3 to 6 feet thick. In places the subsoil is underlain by mottled red and gray, plastic clay. The depth to bedrock is 5 to 15 feet.

Holston soils are strongly acid to very strongly acid. They are low in natural fertility. The root zone is more than 4 feet thick, and roots penetrate easily. Permeability is moderate, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is very severe.

The growth of shortleaf pine and of upland hardwoods, such as white oak, red oak, sugar maple, and ash, is moderate on Holston soils.

Enders soils have a surface layer of very dark grayish-brown to brown, stony or gravelly fine sandy loam. The subsoil is yellowish-red or red silty clay or clay about 30 to 54 inches thick. The lower part is mottled with gray and brown. The depth to shale bedrock is 4 to 8 feet.

Enders soils are strongly acid to very strongly acid. They are low in natural fertility. The root zone is 3 to 6 feet thick. Roots penetrate the clay subsoil slowly. Permeability is very slow, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is very severe.

The growth of upland hardwoods, such as oak, elm, and hickory, is slow on Enders soils. That of shortleaf pine is moderate.

Nearly all of this association is forested with upland hardwoods. A few areas are in shortleaf pine. Steep slopes interfere with the operation of machinery used in harvesting timber. (Holston soils: capability unit VIIe–1, woodland group 4r9, wildlife group 7. Enders soils: capability unit VIIs–1, woodland group 4r3, wildlife group 7)

Holston-Enders association, very steep (HOF).—This association is in the Boston Mountains. It is about 60 percent Holston soils and about 20 percent Enders soils. Both soils are deep, stony, and well drained. The areas are between 20 and 300 acres in size. The slope range is 40 to 65 percent. Included in mapping, and making up about 20 percent of each mapped area, are spots of Allen, Leadvale, Montevallo, and Mountainburg soils, and Rock land.

Holston soils are on benches and foot slopes and in coves. They have a surface layer of very dark grayish-brown, dark-brown, or dark yellowish-brown stony fine sandy loam 4 to 10 inches thick. The subsoil is yellowish-brown, strong-brown, or brown, gravelly or stony sandy clay loam or clay loam 3 to 6 feet thick. In places the subsoil is underlain by mottled red and gray, plastic clay. The depth to bedrock is 5 to 15 feet.

Holston soils are strongly acid to very strongly acid. They are low in natural fertility. The root zone is more than 4 feet thick, and roots penetrate easily. Permeability is moderate, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is very severe.

The growth of shortleaf pine and of upland hardwoods, such as white oak, red oak, sugar maple, and ash, is moderate on Holston soils.

Enders soils have a surface layer of very dark grayish-brown to brown stony fine sandy loam. The subsoil is yellowish-red or red silty clay or clay about 30 to 54 inches thick. The lower part is mottled with gray and brown. The depth to shale bedrock is 4 to 8 feet.

Enders soils are strongly acid to very strongly acid. They are low in natural fertility. The root zone is 3 to 6 feet thick. Roots penetrate the clay subsoil slowly.

Permeability is very slow, and the available water capacity is moderate. Runoff is rapid, and the erosion hazard is very severe.

The growth of upland hardwoods, such as oak, elm, and hickory, is slow on Enders soils. That of shortleaf pine is moderate.

Nearly all of this association is forested with upland hardwoods. A few areas are in shortleaf pine. Steep slopes interfere with the operation of machinery used in harvesting timber. (Holston soils: capability unit VIIe–1, woodland group 4r9, wildlife group 8. Enders soils: capability unit VIIs–1, woodland group 4r3, wildlife group 8)

Iberia Series

The Iberia series consists of level, poorly drained, very slowly permeable clay soils in slack-water areas along the Arkansas River.

Representative profile of Iberia clay in a moist, cultivated field; NE¼NW¼NW¼ sec. 36, T. 9 N., R. 26 W.:

Ap—0 to 6 inches, very dark brown (10YR 2/2) clay; common, fine, faint, dark-brown mottles; weak, fine, granular structure; firm; few fine roots; few fine pores; medium acid; abrupt, smooth boundary. 3 to 8 inches thick.

ACg—6 to 20 inches, very dark gray (10YR 3/1) clay; common, fine, distinct, dark-brown mottles; weak, medium, angular blocky structure; firm, plastic; many slickensides, some of which intersect; few fine roots; few fine pores; medium acid; gradual, smooth boundary. 8 to 16 inches thick.

C1g—20 to 47 inches, dark-gray (5Y 4/1) clay; common, fine and medium, distinct, dark-brown mottles; massive; firm, plastic; many slickensides, a few that intersect; few root channels; few fine pores; slightly acid; gradual, wavy boundary. 20 to 36 inches thick.

C2—47 to 72 inches +, dark-brown (7.5YR 4/4) clay; common, medium, distinct, dark-gray mottles; massive; firm, plastic; many slickensides; neutral.

The Ap or A1 horizon is very dark gray, very dark brown, or very dark grayish brown. The Cg horizon is dark gray or gray. The lower part of the C horizon is dark gray, gray, grayish brown, brown, or dark brown mottled with brown or gray. The depth to a neutral or alkaline horizon is 3 to 5 feet. The reaction is slightly acid to medium acid in the A horizon, slightly acid to medium acid in the upper part of the C horizon, and neutral to mildly alkaline in the lower part of the C horizon.

Iberia soils are associated with Caspiana, Moreland, Morganfield, and Muldrow soils. They are finer textured and grayer below the surface layer and are more poorly drained than the loamy, well-drained Caspiana and Morganfield soils. They are more poorly drained than Moreland and Muldrow soils. They have a finer textured A horizon than Muldrow soils and lack a B horizon, which is characteristic of those soils.

Iberia clay (Ib).—This soil occurs as level, slack-water areas along the Arkansas River. Most areas are between 5 and 200 acres in size. Spots of Muldrow soils are included in some mapped areas.

The surface layer of this Iberia soil is very dark gray, very dark brown, or very dark grayish brown. The underlying material is dark-gray or gray clay mottled with dark brown.

This soil is slightly acid to medium acid. It is moderate in natural fertility, and the response to fertilizer is good. The root zone is 4 feet or more thick. Roots and water penetrate very slowly, and roots are restricted when the subsoil is saturated. The available water capacity is moderate. Runoff is very slow, and wetness is a severe limitation.

This soil is difficult to till. It becomes plastic and swells when wet and becomes hard and cracks when dry. Consequently, it can be worked within only a narrow range of moisture content. If drained, it is well suited to such crops as cotton, soybeans (fig. 9), and small grain. (Capability unit IIIw–2, woodland group 3w5, wildlife group 2)

Iuka Series

The Iuka series consists of moderately well drained, moderately permeable soils derived from young alluvium washed from acid, loamy soils on uplands.

Representative profile of Iuka fine sandy loam in a moist, wooded area of Bruno and Iuka soils; NW¼SE¼SE¼ sec. 18, T. 10 N., R. 27 W.:

A11—0 to 2 inches, dark-brown (10YR 3/3) fine sandy loam; moderate, fine, granular structure; very friable; many roots; strongly acid; abrupt, wavy boundary. 1 to 3 inches thick.

A12—2 to 6 inches, brown (10YR 4/3) fine sandy loam; weak, fine, granular structure; very friable; many roots; strongly acid; clear, smooth boundary. 2 to 6 inches thick.

C1—6 to 23 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; common, medium, distinct, grayish-brown mottles; massive to weak, thin, platy structure; common bedding planes; very friable; common roots; strongly acid; clear, smooth boundary. 12 to 20 inches thick.

C2—23 to 30 inches, variegated grayish-brown (10YR 5/2), dark yellowish-brown (10YR 3/4), and strong-brown (7.5YR 5/8) very fine sandy loam; massive; few bedding planes; friable; few roots; strongly acid; gradual, smooth boundary. 6 to 15 inches thick.

C3—30 to 48 inches, variegated grayish-brown (10YR 5/2), dark yellowish-brown (10YR 4/4), and strong-brown (7.5YR 5/8) loam; massive; few bedding planes; friable; few roots; very strongly acid; clear, wavy boundary. 10 to 24 inches thick.

C4—48 to 62 inches, grayish-brown (10YR 5/2) gravelly loamy sand; common, medium, distinct, strong-brown mottles; massive; loose; very strongly acid; abrupt, wavy boundary. 0 to 4 feet thick.

IIR—62 inches +, massive sandstone.

The A horizon is dark-brown or brown fine sandy loam to loamy fine sand. The C1 horizon is fine sandy loam, sandy loam, or loam. It is dark yellowish brown or yellowish brown. Grayish-brown or gray mottles begin at a depth of 6 to 18 inches, and the C1 horizon is typically mottled throughout. The C2 and C3 horizons are variegated brown and gray and are loam or sandy loam. In places, the C horizon is thinly stratified with contrasting medium and coarse sediments, in no regular sequence. Thin strata of loamy sand are common in all horizons. The C4 horizon is lacking in some soils. Its texture ranges from gravelly or cobbly sandy loam to loamy sand. The depth to the IIR horizon ranges from about 4 to 8 feet or more. The reaction is strongly acid to slightly acid in the A horizon and medium acid to very strongly acid in the C horizon.

Iuka soils are associated with Bruno, Cleora, and Dubbs soils. They are finer textured than Bruno soils. They lack the evident B horizon of Dubbs soils and are not so dark brown in the C horizon as Cleora soils. They also have lower base saturation than Dubbs and Cleora soils. They are more mottled than any of the associated soils.

The Iuka soils in Franklin County are mapped in an undifferentiated unit with Bruno soils. This unit is described under the heading "Bruno Series."

Figure 9.—Soybeans on Iberia clay. Thin stand on poorly drained spot in foreground.

Leadvale Series

The Leadvale series consists of moderately well drained, slowly permeable soils that developed in old alluvium washed from acid, loamy soils on uplands. These soils are on stream terraces, foot slopes, and benches. The slope range is 1 to 12 percent.

Representative profile of Leadvale silt loam, 1 to 3 percent slopes, in a moist meadow; NW¼SW¼SW¼ sec. 22, T. 8 N., R. 27 W.:

Ap—0 to 8 inches, dark yellowish-brown (10YR 4/4) silt loam; weak, fine, granular structure; friable; many fine roots; few fine pores; few very small pebbles; slightly acid; abrupt, smooth boundary. 4 to 9 inches thick.

B21t—8 to 14 inches, yellowish-brown (10YR 5/6) silt loam; weak, fine, subangular blocky structure; friable; few thin clay films; many fine roots; few fine pores; few small pebbles; slightly acid; clear, smooth boundary. 4 to 8 inches thick.

B22t—14 to 22 inches, yellowish-brown (10YR 5/8) silty clay loam; weak, fine, subangular blocky structure; friable; common, thin, patchy clay films; common fine roots; common fine pores; few, fine, dark-brown concretions; medium acid; clear, smooth boundary. 6 to 12 inches thick.

Bx1—22 to 34 inches, yellowish-brown (10YR 5/8) silty clay loam; common, medium, distinct, light-gray mottles; moderate, medium, subangular blocky structure; firm, compact, brittle; many medium clay films; few fine roots; common fine pores; many large pockets of black concretionary material; strongly acid; gradual, wavy boundary. 10 to 24 inches thick.

Bx2—34 to 72 inches +, variegated yellowish-brown (10YR 5/6) and light-gray (10YR 7/1) silty clay loam; moderate, medium, subangular blocky structure; firm, compact, brittle; many medium clay films; few fine roots; common fine pores; few large pockets of black concretionary material; medium acid. 15 to 36 inches thick.

The Ap horizon is dark grayish brown, dark brown, or dark yellowish brown. The A1 horizon, where present, is

dark grayish-brown, dark-brown, or dark yellowish-brown silt loam 3 to 6 inches thick. The A2 horizon, where present, is grayish-brown or brown silt loam 4 to 8 inches thick. In spots the Ap horizon is a mixture of material from the A and B horizons and is yellowish brown. In most cultivated areas the A1 and A2 horizons are mixed, and the Ap horizon rests directly on the B horizon. The B21t horizon is yellowish-brown loam or silt loam. The B22t horizon is yellowish-brown silt loam, silty clay loam, or clay loam. The Bx horizon (fragipan) is yellowish-brown silty clay loam or clay loam that has common or many gray mottles or is variegated yellowish brown, brown, and gray. The depth to the Bx horizon ranges from 18 to 26 inches. The depth to bedrock ranges from 6 to more than 8 feet. The reaction is slightly acid to strongly acid in the A horizon and slightly acid to very strongly acid in the B horizon.

Leadvale soils are associated with Dubbs, Falkner, Guthrie, Ora, Pickwick, Taft, and Wing soils. They are more silty throughout than Ora soils and are less red in the subsoil. They are better drained than Taft and Guthrie soils. They are less clayey in the B horizon than Falkner soils. They have a fragipan, which Dubbs and Pickwick soils do not have. They do not have the reddish color in the B horizon that is characteristic of Pickwick soils. They have a more evident B horizon than Dubbs soils. They do not have the high sodium content in the B horizon that is typical of Wing soils.

Leadvale complex, mounded (Lc).—This complex occurs mainly as nearly level, level, and depressed areas on stream terraces. Most areas are between 5 and 60 acres in size. Rounded mounds make up 15 to 30 percent of each area. They are 30 to 80 feet in diameter, 3 to 5 feet high, and 20 to 100 feet apart. Spots of Taft soils are included in some mapped areas.

The surface layer of the areas between mounds is dark grayish-brown, dark-brown, or dark yellowish-brown silt loam 4 to 12 inches thick. The upper part of the subsoil is yellowish-brown silt loam, silty clay loam, or clay loam 10 to 20 inches thick. The lower part is a firm and brittle fragipan. It is yellowish-brown silty clay loam or clay loam that has common gray mottles or is variegated yellowish brown, brown, and gray. It is 30 to 60 inches thick.

The surface layer in the mounds is dark-brown or dark yellowish-brown silt loam 18 to 30 inches thick. The subsoil is yellowish-brown silt loam, loam, or silty clay loam. The depth to bedrock is 6 to more than 8 feet.

This complex is medium acid to strongly acid. It is low in natural fertility. The response to lime and fertilizer is good. Roots and water easily penetrate as far down as the fragipan, which retards further penetration. The available water capacity is moderate. Runoff is slow, and wetness is a severe limitation.

Drainage is needed. This complex is suited to hay, pasture, and small grain. The mounds interfere somewhat with tillage and mowing operations. Most areas have been cleared and cultivated but are now in pasture or meadow. (Capability unit IIIw–1, woodland group 3o7, wildlife group 4)

Leadvale silt loam, 1 to 3 percent slopes (LeB).—This soil is on stream terraces. Most areas are between 5 and 100 acres in size. Spots of Ora and Taft soils are included in some mapped areas.

The surface layer of this Leadvale soil is dark grayish brown, dark brown, or dark yellowish brown and is 4 to 12 inches thick. The upper part of the subsoil is yellowish-brown silt loam, silty clay loam, or clay loam 10 to 20 inches thick. The lower part is a firm and brittle fragipan. It is yellowish-brown, brown, and gray silty clay loam or clay loam 30 to 60 inches thick. The depth to bedrock is 6 to more than 8 feet.

This soil is slightly acid to strongly acid. It is low in natural fertility. The response to lime and fertilizer is good. Roots and water easily penetrate as far down as the fragipan, which retards further penetration. The available water capacity is moderate. Runoff is medium, and the erosion hazard is moderate.

This soil is suited to row crops, hay, pasture, and small grain. Most areas have been cleared and cultivated but are now in pasture (fig. 10) or meadow. (Capability unit IIe–2, woodland group 3o7, wildlife group 4)

Leadvale silt loam, 3 to 8 percent slopes, eroded (LeC2).—This soil is on stream terraces, foot slopes, and benches. Most areas are between 5 and 60 acres in size. There are a few rills and shallow gullies. Spots of Allen, Ora, and Wing soils are included in some mapped areas.

The surface layer of this Leadvale soil is dark grayish brown, dark brown, or dark yellowish brown and is 4 to 9 inches thick. The upper part of the subsoil is yellowish-brown silt loam, silty clay loam, or clay loam 10 to 20 inches thick. In spots the plow layer is a mixture of material from the surface layer and the subsoil and is yellowish brown. The lower part of the subsoil is a firm and brittle fragipan. It is yellowish-brown, brown, and gray silty clay loam or clay loam 30 to 60 inches thick. The depth to bedrock is 6 to more than 8 feet.

This soil is slightly acid to strongly acid. It is low in natural fertility. The response to lime and fertilizer is good. Roots and water easily penetrate as far down as the fragipan, which retards further penetration. The available water capacity is moderate. Runoff is medium, and the erosion hazard is severe.

This soil is suited to row crops, hay, pasture, and small grain. Most areas have been cleared and cultivated but are now in pasture or meadow. (Capability unit IIIe–2, woodland group 3o7, wildlife group 4)

Leadvale loam, 8 to 12 percent slopes, eroded (LlD2).—This soil is on foot slopes and benches. Most areas are between 5 and 60 acres in size. There are a few rills and shallow gullies. Spots of Allen, Ora, and Wing soils are included in some mapped areas.

The surface layer of this Leadvale soil is dark grayish brown, dark brown, or dark yellowish brown and is 4 to 9 inches thick. The upper part of the subsoil is yellowish-brown silt loam, silty clay loam, or clay loam 10 to 20 inches thick. In spots the plow layer is a mixture of material from the surface layer and the subsoil and is yellowish brown. The lower part of the subsoil is a firm and brittle fragipan. It is yellowish-brown, brown, and gray silty clay loam or clay loam 30 to 60 inches thick. The depth to bedrock is 6 to more than 8 feet.

This soil is slightly acid to strongly acid. It is low in natural fertility. The response to lime and fertilizer is good. Roots and water easily penetrate as far down as the fragipan, which retards further penetration. The available water capacity is moderate. Runoff is rapid, and the erosion hazard is very severe.

This soil is suited to hay and pasture. Most areas have been cleared and cultivated but are now in pasture or meadow or are reverting to woodland. (Capability unit IVe–3, woodland group 3o7, wildlife group 4)

Figure 10.—**Bermudagrass pasture on Leadvale silt loam, 1 to 3 percent slopes.**

Linker Series

The Linker series consists of well-drained, moderately permeable soils that developed in residuum from acid sandstone and siltstone. These soils are on ridges, mountaintops, hilltops, and benches throughout the county. The slope range is 1 to 12 percent.

Representative profile of Linker fine sandy loam, 3 to 8 percent slopes, in a moist, idle field; NE¼SE¼NE¼ sec. 7, T. 11 N., R. 26 W.:

Ap—0 to 5 inches, brown (10YR 5/3) fine sandy loam; weak, medium, granular structure; friable; many roots; common pores; strongly acid; clear, smooth boundary. 3 to 12 inches thick.

B1—5 to 8 inches, yellowish-red (5YR 4/6) fine sandy loam; weak, fine, subangular blocky structure; friable; many roots; common pores; strongly acid; clear, smooth boundary. 3 to 8 inches thick.

B21t—8 to 14 inches, yellowish-red (5YR 4/8) sandy clay loam; moderate, fine, subangular blocky structure; friable; thin patchy clay films on peds and in channels; common roots; common pores; strongly acid; clear, smooth boundary. 4 to 12 inches thick.

B22t—14 to 23 inches, yellowish-red (5YR 5/6) sandy clay loam; moderate, fine to medium, subangular blocky structure; friable to firm; common thin clay films on most peds and in channels; few roots; common pores; strongly acid; clear, wavy boundary. 5 to 15 inches thick.

B23t—23 to 31 inches, red (2.5YR 4/6) gravelly sandy clay loam; common, medium, distinct, yellowish-brown and strong-brown mottles; weak, fine, subangular blocky structure; friable; common patchy clay films on ped and gravel surfaces; few roots; common pores; about 20 percent angular sandstone fragments; very strongly acid; abrupt, smooth boundary. 5 to 14 inches thick.

R—31 to 34 inches +, brown sandstone bedrock; moderately soft surface, which can be chipped with spade.

The Ap horizon ranges from grayish brown to dark brown. In undisturbed areas, there is a dark grayish-brown to very dark grayish-brown A1 horizon that is 2 to 4 inches thick and a brown or grayish-brown A2 horizon that is 3 to 7 inches thick. The B1 horizon is brown, strong-brown, or yellowish-red fine sandy loam or loam. The B2t horizon is yellowish-red or red sandy clay loam or clay loam. The lower part of the B2t horizon is mottled with yellowish brown and brown. The depth to bedrock ranges from 20 to 48 inches. The reaction is strongly acid in the A horizon and strongly acid to very strongly acid in the B horizon.

Linker soils are associated with Allen, Enders, Hartsells, Mountainburg, and Montevallo soils. They have a redder B horizon than Hartsells soils. They are shallower over bedrock than Allen soils. They are deeper over bedrock and

have stronger horizonation than Mountainburg and Montevallo soils. They are coarser textured in the B horizon than Enders soils, and they lack the strongly mottled lower B horizon that is typical of those soils.

Linker fine sandy loam, 1 to 3 percent slopes (LnB).—This soil is on hilltops and broad mountaintops. Most areas are between 5 and 80 acres in size. Spots of Hartsells and Mountainburg soils are included in some mapped areas.

The surface layer of this Linker soil is brown, dark grayish brown, dark brown, or grayish brown and is 3 to 12 inches thick. The subsoil is yellowish-red or red sandy clay loam or clay loam 17 to 36 inches thick. The depth to bedrock is 20 to 48 inches.

This soil is strongly acid to very strongly acid. It is low in natural fertility. The response to lime and fertilizer is good. The root zone is 20 to 48 inches thick. Roots and water penetrate easily. The available water capacity is moderate. Runoff is medium, and the erosion hazard is moderate.

This soil is well suited to row crops, hay, pasture, and small grain. It is moderately well suited to upland oak, shortleaf pine, black walnut, and black locust. Most areas have been cleared and cultivated but are now in orchards, vineyards, pasture, and meadow. Some fields are idle, and others have been planted to shortleaf pine. (Capability unit IIe–1, woodland group 4o7, wildlife group 6)

Linker fine sandy loam, 3 to 8 percent slopes (LnC).—This soil is on mountaintops, hills, and ridges. Most areas are between 5 and 200 acres in size. Spots of Hartsells and Mountainburg soils are included in some mapped areas.

The surface layer of this Linker soil is brown, very dark grayish brown, dark brown, or grayish brown and is 3 to 10 inches thick. The subsoil is yellowish-red or red sandy clay loam or clay loam 17 to 36 inches thick. The depth to bedrock is 20 to 44 inches.

This soil is strongly acid to very strongly acid. It is low in natural fertility. The response to lime and fertilizer is good. The root zone is 20 to 44 inches thick. Roots and water penetrate easily. The available water capacity is moderate. Runoff is medium, and the erosion hazard is severe.

This soil is suited to corn and other row crops, hay, pasture, and small grain. It is moderately well suited to upland oak, shortleaf pine, black walnut, and black locust. Most areas have been cleared and cultivated but are now in orchards, vineyards (fig. 11), pasture, and meadow. Some fields are idle, and others have been planted to shortleaf pine. (Capability unit IIIe–1, woodland group 4o7, wildlife group 6)

Linker fine sandy loam, 8 to 12 percent slopes (LnD).—This soil is on mountaintops, hills, and ridges. Spots of Allen and Mountainburg soils are included in some mapped areas. Most areas are between 5 and 60 acres in size.

The surface layer of this Linker soil is brown, very dark grayish brown, dark brown, or grayish brown and is 3 to 9 inches thick. The subsoil is yellowish-red or red light sandy clay loam or clay loam 17 to 36 inches thick. The depth to bedrock is 20 to 40 inches.

This soil is strongly acid to very strongly acid. It is low in natural fertility. The response to lime and fertilizer is good. The root zone is 20 to 40 inches thick. Roots and water penetrate easily. The available water capacity is moderate. Runoff is rapid, and the erosion hazard is very severe.

This soil is suited to hay, pasture, and small grain. It is moderately well suited to upland oak, shortleaf pine, and black locust. Much of the acreage has been cleared and cultivated, but now most areas are in pasture or meadow. Some fields are idle and are reverting to forest. (Capability unit IVe–1, woodland group 4o7, wildlife group 7)

Linker soils, gently rolling (LKB).—This mapping unit is about 35 percent Linker fine sandy loam, 35 percent Linker gravelly fine sandy loam, and 20 percent Linker stony fine sandy loam. One, two, or all three of these textures may occur in any one mapped area. These soils are on ridges and mountaintops, mainly in the Boston Mountains. The areas are between 20 and 200 acres in size. The slope range is 1 to 8 percent. Included in mapping, and making up about 10 percent of each mapped area, are spots of Allen, Hartsells, and Mountainburg soils.

The surface layer of these Linker soils is grayish brown, brown, or very dark grayish brown and is 3 to 12 inches thick. The subsoil is yellowish-red or red sandy clay loam or clay loam 17 to 30 inches thick. It is gravelly or stony in most places. The depth to bedrock is 20 to 42 inches.

Linker soils are strongly acid to very strongly acid. They are low in natural fertility. The root zone is 20 to 42 inches thick. Roots penetrate easily. The available water capacity is moderate, and permeability is moderate. Runoff is moderate, and the erosion hazard is severe.

Nearly all areas are forested with upland hardwoods. A few are in shortleaf pine. Growth is moderate. (Capability unit IIIe–1, woodland group 4o7, wildlife group 6)

Linker-Mountainburg association, gently rolling (LMB).—This association is about 60 percent Linker soils and about 20 percent Mountainburg soils. It occurs mainly on ridgetops in the Boston Mountains. Both of these soils are well drained and are gravelly or stony in most places. The areas are between 20 and 200 acres in size. The slope range is 1 to 8 percent. Included in mapping, and making up about 20 percent of most mapped areas, are spots of Hartsells, Allen, and Montevallo soils.

Linker soils have a surface layer of grayish-brown, brown, or very dark grayish-brown fine sandy loam, stony fine sandy loam, or gravelly fine sandy loam 3 to 12 inches thick. The subsoil is yellowish-red or red sandy clay loam or clay loam 17 to 30 inches thick. It is gravelly or stony in most places. The depth to bedrock is 20 to 42 inches.

Linker soils are strongly acid to very strongly acid. They are low in natural fertility. The root zone is 20 to 42 inches thick. Roots penetrate easily. The available water capacity is moderate, and permeability is moderate. Runoff is moderate, and the erosion hazard is severe.

The growth of upland hardwoods and shortleaf pine is moderate on Linker soils.

Mountainburg soils have a surface layer of dark grayish-brown, dark-brown, or brown stony or gravelly fine sandy loam 4 to 9 inches thick. The subsoil is reddish-brown or yellowish-red stony or gravelly fine

Figure 11.—**Vineyard on Linker fine sandy loam, 3 to 8 percent slopes.**

sandy loam or loam 6 to 15 inches thick. The depth to bedrock is 12 to 20 inches.

Mountainburg soils are strongly acid to very strongly acid. They are low in natural fertility. The root zone is 12 to 20 inches thick. Roots penetrate easily. The available water capacity is low, and permeability is rapid. Runoff is moderate, and the erosion hazard is very severe. Droughtiness is a limitation.

The growth of upland hardwoods and shortleaf pine is slow on Mountainburg soils.

Nearly all of this association is forested with upland hardwoods. A few areas are in shortleaf pine. (Linker soils: capability unit IIIe–1, woodland group 4o7, wildlife group 6. Mountainburg soils: capability unit IVe–5, woodland group 5d3, wildlife group 10, Sandstone Ridge range site)

McKamie Series

The McKamie series consists of well-drained, very slowly permeable soils that developed in old alluvium. These soils are on high terraces along the Arkansas River. The slope range is 3 to 8 percent.

Representative profile of McKamie silt loam, 3 to 8 percent slopes, in a moist pasture; SW¼SW¼SW¼ sec. 9, T. 9 N., R. 27 W.:

Ap—0 to 5 inches, brown (10YR 5/3) silt loam; weak, fine, granular structure; very friable; many fine roots; few fine pores; strongly acid; abrupt, smooth boundary. 3 to 8 inches thick.

B21t—5 to 9 inches, red (2.5YR 4/6) silty clay; moderate, medium, subangular blocky structure; firm; common, thin, patchy clay films; brown silt streaks on vertical faces; common fine roots; few fine pores; very strongly acid; clear, smooth boundary. 3 to 6 inches thick.

B22t—9 to 14 inches, red (2.5YR 4/8) clay; moderate, medium, subangular blocky structure; very firm; common medium clay films; common fine roots; few fine pores; very strongly acid; gradual, smooth boundary. 3 to 10 inches thick.

B23t—14 to 40 inches, yellowish-red (5YR 5/6) clay; strong, medium, subangular blocky structure; very firm, plastic, very sticky; continuous thick clay films; few fine roots; very strongly acid; gradual, wavy boundary. 15 to 40 inches thick.

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B24t—40 to 72 inches +, yellowish-red (5YR 5/6) silty clay loam; common, medium, distinct, pinkish-gray and reddish-yellow mottles; moderate, medium, subangular blocky structure; firm; common thin clay films; few fine pores; neutral. 18 to 48 inches thick.

The Ap horizon is brown, dark grayish-brown, or dark-brown silt loam. In some profiles there is a B1 horizon, 3 to 6 inches thick, of yellowish-red or red silty clay loam or silt loam. The B21t, B22t, and B23t horizons are red or yellowish-red clay or silty clay. In some soils the B23t horizon is mottled with reddish brown or brown. The B24t horizon is mottled shades of red, yellowish-red, reddish-brown, and gray clay, silty clay, sandy clay, or silty clay loam. The A horizon is slightly acid to strongly acid. The B horizon is strongly acid to very strongly acid to a depth of about 40 inches. The B24t horizon is medium acid to mildly alkaline.

McKamie soils are associated with Muskogee soils. They are redder and are finer textured in the upper part of the B horizon than those soils.

McKamie silt loam, 3 to 8 percent slopes (MkC).—This soil is on high terraces along the flood plains of the Arkansas River. Most areas are between 5 and 70 acres in size. Spots of Muskogee soils and spots where the subsoil is exposed are included in some mapped areas.

The surface layer of this McKamie soil is brown, dark grayish brown, or dark brown and is 3 to 8 inches thick. The subsoil is yellowish-red or red clay. The lower part is clay, silty clay, sandy clay, or silty clay loam mottled or variegated red, yellowish red, reddish brown, and gray. The depth to bedrock is 6 to more than 15 feet.

This soil is medium acid to very strongly acid. It is low in natural fertility. The response to lime and fertilizer is good. The root zone is 3 or more feet thick. Roots and water penetrate the clay subsoil slowly. The available water capacity is moderate. Runoff is medium to rapid, and the erosion hazard is very severe.

This soil tends to crack during prolonged dry periods. It is suited to hay, pasture, and small grain. Most areas have been cleared and cultivated but are now in pasture, meadow, and small grain. (Capability unit IVe–4, woodland group 4o1, wildlife group 9)

Montevallo Series

The Montevallo series consists of somewhat excessively drained, moderately permeable, shallow soils that formed in residuum from acid shale. These soils are on ridges and side slopes throughout the county. The slope range is 1 to 40 percent.

Representative profile of Montevallo gravelly silt loam, 3 to 8 percent slopes, in a moist, idle field; SE¼SW¼SW¼ sec. 34, T. 12 N., R. 26 W.:

Ap—0 to 4 inches, dark grayish-brown (10YR 4/2) gravelly silt loam; weak, medium, granular structure; friable; many roots; common pores; about 15 percent shale and sandstone gravel; strongly acid; clear, smooth boundary. 3 to 5 inches thick.

A2—4 to 7 inches, yellowish-brown (10YR 5/4) gravelly silt loam; weak, fine, subangular blocky structure; friable; common roots; common pores; about 25 percent sandstone and shale gravel; strongly acid; clear, smooth boundary. 0 to 5 inches thick.

B—7 to 11 inches, strong-brown (7.5YR 5/6) gravelly silty clay loam; common, fine, faint, brownish-yellow and very pale brown mottles; moderate, medium to fine, subangular blocky structure; firm; few roots; common pores; about 55 percent shale fragments; very strongly acid; clear, wavy boundary. 3 to 10 inches thick.

R—11 to 20 inches +, shale bedrock in thinly laminated horizontal beds; strong-brown (7.5YR 5/6) silty clay loam between shale layers.

The A1 horizon, where present, is very dark grayish-brown or dark-brown, gravelly or stony silt loam 1 to 4 inches thick. The Ap horizon is dark grayish brown or dark brown. The A2 horizon is brown or yellowish-brown gravelly silt loam. The B horizon is brown, strong-brown, or yellowish-brown gravelly silt loam, silty clay loam, or silty clay. The depth to shale bedrock ranges from 10 to 20 inches. The A horizon is 15 to 35 percent shale and sandstone gravel. The B horizon is dominantly more than 50 percent shale fragments; the percentage ranges from 35 to 60. The reaction is medium acid to strongly acid in the A horizon and strongly acid to very strongly acid in the B horizon.

Montevallo soils are associated with Allen, Enders, Linker, and Mountainburg soils. They are shallower than Allen, Enders, and Linker soils. They are more silty and have a less evident B horizon than Mountainburg soils.

Montevallo gravelly silt loam, 3 to 8 percent slopes (MlC).—This soil is on narrow ridges, rolling ridges, and side slopes. Most areas are between 5 and 30 acres in size. Rock outcrops and spots of Mountainburg soils are included in some mapped areas.

The surface layer of this Montevallo soil is very dark grayish brown, dark grayish brown, or dark brown and is 3 to 10 inches thick. The subsoil is brown, strong-brown, or yellowish-brown gravelly silt loam, silty clay loam, or silty clay. The depth to shale bedrock is 10 to 20 inches. The surface layer is 15 to 35 percent sandstone and shale gravel. The subsoil is 35 to 60 percent shale fragments.

This soil is strongly acid to very strongly acid. It is low in natural fertility. The response to lime and fertilizer is poor. The root zone is 10 to 20 inches thick. The available water capacity is low. Runoff is rapid, and the erosion hazard is very severe. Droughtiness is a limitation.

This soil is suited to pasture, hay, and woodland. Only about 25 percent of the acreage has been cleared and is used for native pasture; the rest is forested with low-grade hardwoods. (Capability unit IVe–5, woodland group 5d3, wildlife group 10, Shale Break range site)

Montevallo-Mountainburg complex, 1 to 12 percent slopes (MmD).—This complex is about 60 percent Montevallo soils and 30 percent Mountainburg soils. Montevallo soils are somewhat excessively drained, and Mountainburg soils are well drained. Rock outcrops and spots of Enders soils are included in most mapped areas.

Montevallo soils are on narrow ridges, rolling ridges, and side slopes. They have a surface layer of very dark grayish-brown, dark grayish-brown, or dark-brown gravelly or stony silt loam 3 to 10 inches thick. Their subsoil is brown, strong-brown, or yellowish-brown gravelly silt loam, silty clay loam, or silty clay. The depth to bedrock is 10 to 20 inches. The surface layer is 15 to 35 percent sandstone. The subsoil is 35 to 60 percent shale fragments.

Mountainburg soils are on narrow ridges. They have a surface layer of dark grayish-brown, dark-brown, or brown gravelly or stony fine sandy loam 3 to 9 inches thick. Their subsoil is reddish-brown or yellowish-red gravelly or stony fine sandy loam or loam. The depth to bedrock is 12 to 20 inches. Stones and gravel make up 15 to 40 percent of the soil mass.

Both of these soils are strongly acid to very strongly acid. They are low in natural fertility. The root zone is 10 to 20 inches thick. The available water capacity is low. Runoff is moderate, and the erosion hazard is severe. Droughtiness is a limitation.

These soils are suited to pasture, hay, native grass rangeland, and woodland. Most areas are forested with low-grade hardwoods and scattered shortleaf pine. (Montevallo soils: capability unit VIs–1, woodland group 5d3, wildlife group 10, Shale Break range site. Mountainburg soils: capability unit VIs–1, woodland group 5d3, wildlife group 10, Sandstone Ridge range site)

Montevallo-Mountainburg complex, 12 to 40 percent slopes (MmE).—This complex is about 60 percent Montevallo soils and 30 percent Mountainburg soils. Montevallo soils are somewhat excessively drained and Mountainburg soils are well drained. Rock outcrops and spots of Enders soils are included in most mapped areas.

Montevallo soils are on narrow ridges and side slopes. Their surface layer is very dark grayish-brown, dark grayish-brown, or dark-brown gravelly or stony silt loam 3 to 10 inches thick. Their subsoil is brown, strong-brown, or yellowish-brown gravelly silt loam, silty clay loam, or silty clay. The depth to bedrock is 10 to 20 inches. The surface layer is 15 to 35 percent sandstone. The subsoil is 35 to 60 percent shale fragments.

Mountainburg soils are on narrow ridges. Their surface layer is dark grayish-brown, dark-brown, or brown gravelly or stony fine sandy loam 3 to 9 inches thick. Their subsoil is reddish-brown or yellowish-red gravelly or stony fine sandy loam or loam. The depth to bedrock is 12 to 20 inches. Stones and gravel make up 15 to 40 percent of the soil mass.

Both of these soils are strongly acid to very strongly acid. They are low in natural fertility. The root zone is 10 to 20 inches thick. The available water capacity is low. Runoff is rapid, and the erosion hazard is very severe. Droughtiness is a limitation.

These soils are suited to pasture, native grass rangeland, and woodland. Most areas are forested with low-grade hardwoods and scattered shortleaf pine. (Montevallo soils: capability unit VIIs–2, woodland group 5d3, wildlife group 10, Shale Break range site. Mountainburg soils: capability unit VIIs–2, woodland group 5d3, wildlife group 10, Sandstone Ridge range site)

Moreland Series

The Moreland series consists of level, moderately well drained, very slowly permeable soils that formed in clayey alluvium along the Arkansas River.

Representative profile of Moreland silty clay loam in a moist, cultivated field; SW¼NW¼SE¼ sec. 1, T. 9 N., R. 29 W.:

Ap—0 to 6 inches, dark-brown (7.5YR 3/2) silty clay loam; weak, fine, granular structure; friable; many fine roots; few fine pores; slightly acid; abrupt, smooth boundary. 4 to 7 inches thick.

A11—6 to 13 inches, dark-brown (7.5YR 3/2) silty clay loam; moderate, fine, subangular blocky structure; firm; few slickensides; common fine roots; common fine pores; slightly acid; clear, smooth boundary. 0 to 8 inches thick.

A12—13 to 27 inches, dark-brown (7.5YR 3/2) silty clay; moderate, fine, subangular blocky structure; firm; common slickensides, a few that intersect; common fine roots; common fine pores; slightly acid; gradual, wavy boundary. 8 to 20 inches thick.

B—27 to 50 inches, dark reddish-brown (5YR 3/4) silty clay; weak, medium, subangular blocky structure; firm; common slickensides, a few that intersect; few fine roots; few fine pores; slightly acid; gradual, smooth boundary. 15 to 30 inches thick.

C—50 to 72 inches +, dark reddish-brown (5YR 3/4) silty clay; common strata 1 to 2 inches thick of reddish-brown (5YR 4/4) fine sandy loam; massive; common bedding planes; firm; common fine pores; slightly acid. Several feet thick.

The thickness of the Ap horizon ranges from 4 to 7 inches, and that of the A1 horizon from 12 to 28 inches. The B horizon is dark reddish-brown, reddish-brown, or dark-brown silty clay or clay. The C horizon is dark reddish-brown, reddish-brown, or brown silty clay or clay and has common to many, thin strata of fine sandy loam, loam, or clay loam. At a depth of 4 to 8 feet is a layer that consists of thinly bedded loamy and clayey sediments or massive beds of loam or fine sandy loam. The reaction is slightly acid to medium acid in the A horizon and neutral to slightly acid in the C horizon.

Moreland soils are associated with Caspiana, Iberia, Morganfield, and Muldrow soils. They are more clayey than Caspiana and Morganfield soils. They are browner below the surface layer and are better drained than Iberia and Muldrow soils.

Moreland silty clay loam (Mo).—This level soil occurs on the higher parts of the Arkansas River flood plain. Most areas are between 10 and 300 acres in size. Spots of Muldrow and Iberia soils are included in some mapped areas.

The surface layer of this Moreland soil is dark brown. The subsoil is dark-brown, dark reddish-brown, or reddish-brown silty clay or clay and has thin layers of loamy material in the lower part.

This soil is medium acid to neutral. It is moderate to high in natural fertility, and the response to fertilizer is good. The root zone is 4 feet or more thick. Roots and water penetrate slowly. The available water capacity is moderate. Runoff is slow, and the hazard of excess surface water is moderate.

This soil is well suited to cotton, soybeans, small grain, and alfalfa, but it is difficult to till and can be worked within only a narrow range of moisture content. Cracks are likely to form during prolonged dry periods, and farming operations are likely to be delayed several days after a rain. (Capability unit IIw–1, woodland group 3w5, wildlife group 2)

Morganfield Series

The Morganfield series consists of well-drained, moderately permeable soils derived from mixed alluvium deposited by the Arkansas River. The slope range is 0 to 3 percent.

Representative profile of Morganfield very fine sandy loam in a moist, cultivated field; NE¼SE¼NE¼ sec. 1, T. 8 N., R. 26 W.:

Ap—0 to 8 inches, dark-brown (7.5YR 4/2) very fine sandy loam; weak, fine, granular structure; very friable; many fine roots; few fine pores; medium acid; abrupt, smooth boundary. 5 to 9 inches thick.

A1—8 to 18 inches, dark-brown (7.5YR 4/4) very fine sandy loam; few brown horizontal streaks; structureless; common bedding planes; friable; few fine roots; few fine pores; slightly acid; gradual, wavy boundary. 6 to 12 inches thick.

C1—18 to 24 inches, reddish-brown (5YR 4/3) very fine sandy loam; weak, medium, subangular blocky structure; friable; few fine roots; common fine pores; few channels and worm casts; slightly acid; gradual, wavy boundary. 4 to 12 inches thick.

C2—24 to 35 inches, dark-brown (7.5YR 4/2) very fine sandy loam; weak, medium, subangular blocky structure; friable; few fine roots; many fine pores; few channels and worm casts; slightly acid; gradual, wavy boundary. 10 to 36 inches thick.

C3—35 to 57 inches, dark reddish-brown (5YR 3/2) fine sandy loam; massive; friable; common fine pores; neutral; gradual, wavy boundary. 0 to 30 inches thick.

C4—57 to 72 inches +, dark-brown (7.5YR 3/2) fine sandy loam; massive; friable; common fine pores; neutral. 1 foot to several feet thick.

The Ap horizon is dark brown, dark reddish brown, or reddish brown. The A1 horizon is dark brown to reddish brown. It has common to many, evident bedding planes that locally mark the limits of thin contrasting strata. The C horizon is dark-brown, dark reddish-brown, or reddish-brown very fine sandy loam. In many soils the subhorizons of the C horizon have evident bedding planes. The depth to stratified sandy and loamy sediments ranges from 4 to 7 feet. The reaction is slightly acid to medium acid in the A horizon and slightly acid to mildly alkaline in the C horizon.

Morganfield soils are associated with Bruno, Caspiana, Moreland, Muldrow, and Iberia soils. They are finer textured than Bruno soils. They contain less clay than Caspiana soils, which have a B horizon. They are better drained and coarser textured than Muldrow and Iberia soils, which are grayish and clayey in the C horizon. They are coarser textured than Moreland soils.

Morganfield very fine sandy loam (Ms).—This level to nearly level soil is on the higher parts of the Arkansas River flood plain. Most areas are between 10 and 160 acres in size. Spots of Bruno and Caspiana soils are included in some mapped areas.

The surface layer of this Morganfield soil is dark brown, dark reddish brown, or reddish brown. The underlying material is dark-brown, dark reddish-brown, or reddish-brown very fine sandy loam. At a depth of 4 to 7 feet are sandy and loamy stratified sediments.

This soil is medium acid to mildly alkaline. It is moderate to high in natural fertility. The root zone is 4 feet or more thick. Roots and water penetrate easily. The available water capacity is moderate. Runoff is slow.

This soil is well suited to corn, cotton, soybeans, and small grain. (Capability unit I–1, woodland group 2o7, wildlife group 1)

Mountainburg Series

The Mountainburg series consists of well-drained, rapidly permeable, shallow soils that formed in residuum from acid sandstone. These soils occur throughout the county, mainly on hilltops, mountaintops, and ridges. The slope range is 1 to 65 percent.

Representative profile of Mountainburg gravelly fine sandy loam, 3 to 8 percent slopes, in a moist, native grass pasture; SW¼SW¼NE¼ sec. 13, T. 10 N., R. 28 W.:

Ap—0 to 3 inches, dark-brown (7.5YR 3/2) gravelly fine sandy loam; weak, fine, granular structure; very friable; many fine roots; about 20 percent angular sandstone gravel; strongly acid; abrupt, smooth boundary. 3 to 5 inches thick.

B1—3 to 6 inches, reddish-brown (5YR 4/4) gravelly fine sandy loam; weak, medium, subangular blocky structure; friable; many fine roots; few fine pores; about 15 percent angular sandstone gravel; very strongly acid; clear, smooth boundary. 2 to 5 inches thick.

B21t—6 to 11 inches, yellowish-red (5YR 4/6) gravelly fine sandy loam; weak, medium, subangular blocky structure; friable; few, thin, patchy clay films on ped faces and in some pores; common fine roots; few fine pores; about 10 percent angular sandstone fragments; very strongly acid; clear, smooth boundary. 0 to 8 inches thick.

B22t—11 to 18 inches, yellowish-red (5YR 4/6) gravelly loam; weak, medium, subangular blocky structure; friable; few, thin, patchy clay films in pores and on ped faces; few fine roots; few fine pores; about 10 percent angular sandstone fragments; very strongly acid; abrupt, wavy boundary. 0 to 10 inches thick.

R—18 inches +, sandstone bedrock. Cannot be dug with a spade.

The surface horizon is gravelly or stony fine sandy loam. The A1 horizon, where present, is 1 to 3 inches thick and is brown, dark brown, or dark grayish brown. The A2 horizon, where present, is 2 to 6 inches thick and consists of brown fine sandy loam. The Ap horizon ranges from grayish brown to dark brown to reddish brown. The B1 horizon is reddish brown to yellowish red. The B2t horizon is reddish-brown to yellowish-red gravelly or stony fine sandy loam or loam 6 to 18 inches thick. The depth to bedrock ranges from 12 to 20 inches. Each horizon is 15 to 50 percent gravel or sandstone. The reaction is medium acid to strongly acid in the A horizon and strongly acid to very strongly acid in the B horizon.

Mountainburg soils are associated with Allen, Hartsells, Linker, Montevallo, and Enders soils. They have a coarser textured B horizon than all of the associated soils. They are shallower than Allen, Hartsells, Linker, and Enders soils. They have a thicker and redder B horizon than Montevallo soils, which developed from shale.

Mountainburg gravelly fine sandy loam, 1 to 3 percent slopes (MtB).—This soil is on mountaintops and hills. Most areas are between 5 and 50 acres in size. Spots of Linker, Hartsells, and Montevallo soils are included in some mapped areas.

The surface layer of this Mountainburg soil is dark grayish brown, dark brown, brown, or reddish brown and is 3 to 9 inches thick. The subsoil is reddish-brown or yellowish-red gravelly fine sandy loam or gravelly loam 6 to 15 inches thick. Sandstone gravel and a few stones make up 15 to 30 percent of the soil mass. The depth to bedrock is 12 to 20 inches.

This soil is strongly acid to very strongly acid. It is low in natural fertility. The response to lime and fertilizer is fair. The root zone is 12 to 20 inches thick. Roots and water penetrate easily. The available water capacity is low. Runoff is moderate, and the erosion hazard is severe. Droughtiness is a limitation.

This soil is suited to hay, pasture, and small grain. Most areas have been cleared and cultivated but are now in hay or pasture. (Capability unit IIIe–4, woodland group 5d3, wildlife group 10, Sandstone Ridge range site)

Mountainburg gravelly fine sandy loam, 3 to 8 percent slopes (MtC).—This soil is on mountaintops, hills, and ridges. Most areas are between 5 and 120 acres in size. Spots of Linker, Hartsells, and Montevallo soils are included in some mapped areas.

The surface layer of this Mountainburg soil is dark grayish brown, dark brown, brown, or reddish brown and is 3 to 9 inches thick. The subsoil is reddish-brown or yellowish-red gravelly fine sandy loam or gravelly loam 6 to 15 inches thick. Sandstone gravel and a few stones make up 15 to 30 percent of the soil mass. The depth to bedrock is 12 to 20 inches.

This soil is strongly acid to very strongly acid. It is low in natural fertility. The response to lime and fertilizer is fair. The root zone is 12 to 20 inches thick. Roots and water penetrate easily. The available water capacity is low. Runoff is rapid, and the erosion hazard is very severe. Droughtiness is a limitation.

This soil is suited to hay, pasture, and small grain. Most areas have been cleared and cultivated but are now in pasture or hay or are reverting to woodland. (Capability unit IVe–5, woodland group 5d3, wildlife group 10, Sandstone Ridge range site)

Mountainburg gravelly fine sandy loam, 8 to 12 percent slopes (MtD).—This soil is on mountaintops, hills, and ridges. Most areas are between 5 and 60 acres in size. Spots of Allen, Linker, and Montevallo soils are included in some mapped areas.

The surface layer of this Mountainburg soil is dark grayish brown, dark brown, brown, or reddish brown and is 3 to 9 inches thick. The subsoil is reddish-brown or yellowish-red gravelly fine sandy loam or gravelly loam 6 to 15 inches thick. Sandstone gravel and a few stones make up 15 to 30 percent of the soil mass. The depth to bedrock is 12 to 20 inches.

This soil is strongly acid to very strongly acid. It is low in natural fertility. The response to lime and fertilizer is fair. The root zone is 12 to 20 inches thick. Roots and water penetrate easily. The available water capacity is low. Runoff is rapid, and the erosion hazard is severe. Droughtiness is a limitation.

Most areas are in native woodland of mixed upland hardwoods. A few small areas are cleared and used for pasture. (Capability unit VIe–3, woodland group 5d3, wildlife group 10, Sandstone Ridge range site)

Mountainburg stony fine sandy loam, 1 to 12 percent slopes (MuD).—This soil is on mountaintops, hills, and ridges. Most areas are between 10 and 120 acres in size. Spots of Allen, Linker, and Montevallo soils are included in some mapped areas.

The surface layer of the Mountainburg soil is dark grayish brown, dark brown, or brown and is 3 to 9 inches thick. The subsoil is reddish-brown or yellowish-red stony fine sandy loam or stony loam 6 to 15 inches thick. Stones and gravel make up 15 to 40 percent of the soil mass. The depth to bedrock is 12 to 20 inches.

This soil is strongly acid to very strongly acid. It is low in natural fertility. The root zone is 12 to 20 inches thick. Roots and water penetrate easily. The available water capacity is low. Runoff is moderate, and the erosion hazard is severe. Droughtiness is a limitation.

Most areas are in native woodland of mixed upland hardwoods and pine. A few small areas are cleared and used for pasture. There are enough stones 3 to 18 inches in diameter to interfere with logging and tillage operations, but not enough to make such operations impractical. (Capability unit VIs–1, woodland group 5x3, wildlife group 10, Sandstone Ridge range site)

Mountainburg stony fine sandy loam, 12 to 40 percent slopes (MuE).—This soil is on mountaintops, hills, and ridges. Most areas are between 10 and 240 acres in size. Spots of Allen, Enders, and Montevallo soils are included in most mapped areas.

The surface layer of this Mountainburg soil is dark brown, dark grayish brown, or brown and is 3 to 9 inches thick. The subsoil is reddish-brown or yellowish-red stony fine sandy loam or stony loam 6 to 15 inches thick. Stones and gravel make up 15 to 40 percent of the soil mass. The depth to bedrock is 12 to 20 inches.

This soil is strongly acid to very strongly acid. It is low in natural fertility. The root zone is 12 to 20 inches thick. Roots and water penetrate easily. The available water capacity is low. Runoff is rapid, and the erosion hazard is very severe. Droughtiness is a limitation.

Most areas are in native woodland of mixed hardwoods and pine. A few small areas are used for pasture. There are enough stones 3 to 18 inches in diameter to interfere with logging and tillage operations, but not enough to make such operations impractical. (Capability unit VIIs–2, woodland group 5x3, wildlife group 10, Sandstone Ridge range site)

Mountainburg-Rock land association, steep (MRE).—This association occurs as narrow, steep bands on the margins of ridges and mountaintops and on mountainsides. It is about 45 percent Mountainburg soils and 35 percent Rock land. The areas are between 40 and 500 acres in size and are mostly in the Boston Mountains. Except for vertical bluffs, which occur in most areas, the overall gradient is 20 to 65 percent. Included in mapping, and making up about 20 percent of most mapped areas, are spots of Allen and Montevallo soils and exposed shale bedrock.

Mountainburg soils have a surface layer of dark grayish-brown, dark-brown, or brown stony fine sandy loam 4 to 9 inches thick. The subsoil is reddish-brown or yellowish-red stony fine sandy loam or loam 6 to 15 inches thick. The depth to bedrock is 12 to 20 inches.

Mountainburg soils are strongly acid to very strongly acid. They are low in natural fertility. The root zone is less than 20 inches thick. Permeability is rapid, and the available water capacity is low to very low. Runoff is rapid, and the erosion hazard is severe. Droughtiness is a limitation.

The growth of upland hardwoods and shortleaf pine is slow on Mountainburg soils.

Rock land is characterized by ledges and bluffs of sandstone and scattered spots of gravelly or stony sandy loam a few inches thick on the surface.

Redcedar, hawthorne, blackjack oak, and winged elm are the major woody plants on Rock land. Little bluestem, skeletongrass, and perennial three-awn are moderately well suited native grasses.

This association is poorly suited to farm crops and trees. It is only moderately well suited to native range plants. (Mountainburg soils: capability unit VIIs–2, woodland group 5d3, wildlife group 10, Sandstone Ridge range site. Rock land: capability unit VIIs–3, woodland group 5x8, wildlife group 10, Sandstone Ledge range site)

Muldrow Series

The Muldrow series consists of level, somewhat poorly drained soils that have a very slowly permeable, clayey subsoil. These soils formed in slack-water areas along the Arkansas River.

Representative profile of Muldrow silt loam in a moist, cultivated field; NW¼NE¼NE¼ sec. 1, T. 9 N., R. 29 W.:

Ap—0 to 4 inches, dark-brown (10YR 3/3) silt loam; weak, medium, granular structure; friable; many fine roots; few fine pores; medium acid; clear, smooth boundary. 4 to 7 inches thick.

A1—4 to 10 inches, very dark grayish-brown (10YR 3/2) silt loam; few, fine, faint, gray mottles; weak, medium, subangular blocky structure; friable; common fine roots; common fine pores; medium acid; abrupt, smooth boundary. 3 to 12 inches thick.

ABg—10 to 17 inches, grayish-brown (2.5YR 5/2) silty clay loam; many, medium, prominent, yellowish-brown and yellowish-red mottles; weak, fine, subangular blocky structure; friable; common fine roots; common fine pores; few, small, dark-brown concretions; medium acid; clear, smooth boundary. 3 to 9 inches thick.

Btg—17 to 41 inches, dark-gray (5Y 4/1) clay; many, medium, prominent, yellowish-brown mottles; moderate, fine, angular blocky structure; firm, plastic; common slickensides; few, small, dark-brown concretions; medium acid; gradual, wavy boundary. 18 to 36 inches thick.

Cg—41 to 72 inches +, mottled dark-gray (10YR 4/1) and dark yellowish-brown (10YR 4/4) silty clay; massive; firm, plastic; few fine pores; few, small, dark-colored concretions; slightly acid; several feet thick.

The A horizon is very dark grayish brown or dark brown and is 7 to 18 inches thick. The ABg horizon is grayish-brown, gray, dark-gray, or dark grayish-brown silty clay loam to clay loam. The Btg horizon is dark-gray or gray clay that has common to many, yellowish-brown mottles. The Cg horizon is mottled gray and brown or is dominantly gray mottled with brown. Its texture ranges from clay to clay loam. In places there are thin lenses of silt loam or fine sandy loam. The reaction is medium acid to slightly acid in the A horizon, medium acid to strongly acid in the B horizon, and medium acid to neutral in the C horizon.

Muldrow soils are associated with Caspiana, Moreland, Morganfield, and Iberia soils. They have a coarser textured surface layer than Moreland and Iberia soils. They have a B horizon, which is lacking in Iberia soils. They are more poorly drained and are grayer and finer textured below the surface layer than Caspiana and Morganfield soils. They are grayer in the B horizon and are more poorly drained than Moreland soils.

Muldrow silt loam (Mw).—This level soil occurs in slack-water areas along the Arkansas River. Most areas are between 5 and 80 acres in size. Spots of Iberia and Caspiana soils are included in some mapped areas.

The surface layer of this Muldrow soil is very dark grayish brown or dark brown. The subsoil is dark-gray or gray clay mottled with brown, red, yellowish brown, and yellowish red. Below this is clay to clay loam mottled with gray and brown.

This soil is medium acid to slightly acid in the surface layer and medium acid to strongly acid in the subsoil. It is moderate in natural fertility, and the response to fertilizer is good. The root zone is 4 feet or more thick. Roots and water penetrate the subsoil slowly, and roots are restricted when the subsoil is saturated. The available water capacity is moderate. Runoff is slow, and the hazard of excess water is moderate.

This soil is well suited to cotton, soybeans, small grain, and alfalfa. Farming operations are likely to be delayed several days after a rain. (Capability unit IIIw–2, woodland group 3w5, wildlife group 2)

Muskogee Series

The Muskogee series consists of moderately well drained, very slowly permeable soils that developed in old alluvium. These soils are on high terraces along the Arkansas River. The slope range is 1 to 8 percent.

Representative profile of Muskogee silt loam, 1 to 3 percent slopes, in a moist pasture; NE¼SW¼NW¼ sec. 24, T. 9 N., R. 27 W.:

Ap—0 to 5 inches, dark-brown (10YR 4/3) silt loam; moderate, medium, granular structure; very friable; many fine roots; common fine pores; very strongly acid; clear, smooth boundary. 3 to 6 inches thick.

A2—5 to 9 inches, yellowish-brown (10YR 5/4) silt loam; weak, fine, subangular blocky structure; friable; many fine roots; common fine pores; strongly acid; clear, smooth boundary. 4 to 8 inches thick.

B1—9 to 14 inches, yellowish-brown (10YR 5/6) silt loam; weak, medium, subangular blocky structure; friable; common fine roots; common fine pores; strongly acid; gradual, smooth boundary. 5 to 8 inches thick.

B21t—14 to 26 inches, variegated light yellowish-brown (10YR 6/4) and yellowish-brown (10YR 5/6) silty clay loam; moderate, medium, subangular blocky structure; friable; common, thin, patchy clay films; few fine roots; few fine pores; few very small concretions; strongly acid; clear, smooth boundary. 8 to 16 inches thick.

B22t—26 to 46 inches, variegated light brownish-gray (2.5Y 6/2) and yellowish-red (5YR 5/6) silty clay; strong, medium, angular blocky structure; very firm, plastic and sticky; common medium clay films; few fine roots; strongly acid; gradual, wavy boundary. 14 to 24 inches thick.

C—46 to 72 inches +, red (2.5YR 4/6) silty clay; few, medium, prominent, light-gray mottles and few, medium, distinct, light reddish-brown mottles; massive; very firm, plastic and sticky; strongly acid. 1 to several feet thick.

The Ap horizon is dark grayish brown or dark brown. The A1 horizon, where present, is very dark grayish-brown or dark-brown silt loam 1 to 5 inches thick. The A2 horizon is brown or yellowish-brown silt loam. The B1 horizon is yellowish brown or strong brown. The B21t horizon is yellowish brown, strong brown, light yellowish brown, or variegated shades of brown. It is silty clay loam or heavy silt loam. The B22t horizon is variegated gray, brown, and red silty clay or clay. The C horizon is red mottled with gray, or is variegated red, gray, and brown. It is clay or silty clay. The depth to a IIC horizon of thinly stratified sand, silt, and clay ranges from 5 to 10 feet. The reaction is medium acid to very strongly acid in the A horizon, strongly acid to very strongly acid in the B horizon, and strongly acid to slightly acid in the C horizon.

Muskogee soils are associated with McKamie soils. They have the same topography and developed in similar parent material. They are more silty and less clayey in the upper part of the B horizon than McKamie soils, and they are more mottled below a depth of about 26 inches than those soils.

Muskogee silt loam, 1 to 3 percent slopes (MzB).—This soil is on high terraces along the Arkansas River. Most areas are between 10 and 100 acres in size. Included in mapping were spots of poorly drained soils and spots of McKamie soils.

The surface layer of this Muskogee soil is dark brown or dark grayish brown and is 7 to 14 inches thick. The

upper part of the subsoil is yellowish-brown or strong-brown silty clay loam 13 to 24 inches thick. The lower part is variegated gray, brown, and red clay or silty clay. It is 2 to several feet thick. The depth to thinly stratified sand, silt, and clay ranges from 5 to 10 feet.

This soil is strongly acid to very strongly acid. It is low in natural fertility. The response to lime and fertilizer is good. Roots and water easily penetrate the subsoil as far down as the clay layer, which retards further penetration. The available water capacity is moderate. Runoff is medium, and the erosion hazard is moderate.

This soil is well suited to soybeans and other row crops, and to hay, pasture, and small grain. Most areas have been cleared and cultivated but are now in pasture, meadow, and small grain. (Capability unit IIe–3, woodland group 4o1, wildlife group 9)

Muskogee silt loam, 3 to 8 percent slopes (MzC).—This soil is on high terraces along the Arkansas River. Most areas are between 10 and 200 acres in size. Included in mapping were eroded spots and spots of McKamie soils.

The surface layer of this Muskogee soil is very dark grayish brown or dark brown and is 7 to 12 inches thick. The upper part of the subsoil is yellowish-brown or strong-brown silty clay loam 13 to 24 inches thick. The lower part of the subsoil is variegated gray, brown, and red clay or silty clay. It is 2 to several feet thick. The depth to thinly stratified sand, silt, and clay ranges from 5 to 10 feet.

This soil is strongly acid to very strongly acid. It is low in natural fertility. The response to lime and fertilizer is good. Roots and water easily penetrate the subsoil as far down as the clay layer, which retards further penetration. The available water capacity is moderate. Runoff is medium to rapid, and the erosion hazard is severe.

This soil is suited to soybeans and other row crops, and to hay, pasture, and small grain. Most areas have been cleared and cultivated but are now in pasture, meadow, and small grain. (Capability unit IIIe–3, woodland group 4o1, wildlife group 9)

Ora Series

The Ora series consists of moderately well drained, slowly permeable soils that developed in old alluvium or colluvium derived from acid sandstone and shale. These soils are on hillsides, foot slopes, and stream terraces. The slope range is 3 to 8 percent.

Representative profile of Ora fine sandy loam, 3 to 8 percent slopes, eroded, in a moist, idle field; NE¼SE¼NW¼ sec. 29, T. 12 N., R. 26 W.:

Ap1—0 to 2 inches, brown (10YR 4/3) fine sandy loam; weak, medium, granular structure; friable; many fine roots; many fine pores; about 10 percent sandstone gravel; strongly acid; abrupt, smooth boundary.

Ap2—2 to 5 inches, dark yellowish-brown (10YR 4/4) fine sandy loam; weak, medium, granular structure; friable; many fine roots; many fine pores; about 10 percent sandstone gravel; very strongly acid; abrupt, smooth boundary. Combined thickness of Ap horizons is 4 to 8 inches.

B1t—5 to 10 inches, brown (7.5YR 4/4) fine sandy loam; weak, medium, subangular blocky structure; friable; few thin clay films; common fine roots; common fine pores; about 3 percent sandstone gravel; very strongly acid; clear, smooth boundary. 0 to 10 inches thick.

B2t—10 to 23 inches, yellowish-red (5YR 4/8) clay loam; moderate, medium, subangular blocky structure; firm; common thin clay films; few fine roots; common fine pores; very strongly acid; gradual, smooth boundary. 3 to 25 inches thick.

Bx1—23 to 39 inches, red (2.5YR 4/6) clay loam; common, medium, prominent, light-brown and pale-brown mottles; weak, coarse, angular blocky structure; very firm, compact, brittle; common medium clay films on ped faces and in pores; few fine roots; common vesicular pores; few, fine, dark-colored concretions; very strongly acid; gradual, smooth boundary. 10 to 20 inches thick.

Bx2—39 to 60 inches, red (2.5YR 4/6) gravelly sandy clay loam; common, medium, prominent, light-brown and pale-brown mottles; weak, coarse, angular blocky structure; very firm, compact, brittle; common thin clay films on ped surfaces and in pores; few fine roots; common vesicular pores; common, dark-colored, hard concretions; about 20 percent sandstone gravel; very strongly acid; abrupt, wavy boundary. 15 to 30 inches thick.

IIR—60 inches +, sandstone bedrock.

The A horizon ranges from dark grayish brown to brown and dark yellowish brown. In spots the Ap horizon is a mixture of material from the A and B horizons and is brown. The B2t horizon is strong-brown or yellowish-red fine sandy loam or clay loam. The Bx horizon (fragipan) is at a depth of 2 to 3 feet. It is fine sandy loam, loam, clay loam, or sandy clay loam and is gravelly in places. It is red or yellowish red mottled with brown. In places the solum is underlain by a C horizon of fine sandy loam or sandy clay loam that locally is up to 20 percent gravel and cobblestones. It ranges up to several feet thick. The depth to bedrock ranges from 5 to more than 8 feet. The reaction is strongly acid to very strongly acid both in the A horizon and in the B horizon.

Ora soils are associated with Allen, Enders, Holston, Leadvale, Pickwick, Taft, and Wing soils. They have a mottled fragipan, which the Allen, Enders, Holston, and Pickwick soils do not have. They are coarser textured than Pickwick and Enders soils. They have a redder, more sandy B horizon than Leadvale and Taft soils, and they are less mottled and better drained than Taft soils. They do not have the high sodium content in the B horizon that is typical of Wing soils.

Ora fine sandy loam, 3 to 8 percent slopes, eroded (OrC2).—This soil is on hillsides, foot slopes, and stream terraces. Most areas are between 5 and 60 acres in size. There are a few rills and shallow gullies. Spots of Allen, Leadvale, and Pickwick soils are included in some mapped areas.

The surface layer of this Ora soil is dark grayish brown, brown, dark yellowish brown, or yellowish brown and is 4 to 8 inches thick. The upper part of the subsoil is brown, strong-brown, or yellowish-red fine sandy loam or clay loam 18 to 28 inches thick. In spots the plow layer is brown and is a mixture of material from the surface layer and the subsoil. The lower part of the subsoil (fragipan) is red or yellowish red mottled with brown. It is fine sandy loam, loam, clay loam, or sandy clay loam and is 25 to 40 inches thick. The depth to bedrock is 5 to more than 8 feet.

This soil is strongly acid to very strongly acid. It is low in natural fertility. The response to lime and fertilizer is good. Roots and water easily penetrate as far down as the fragipan, which retards further penetration. The available water capacity is moderate. Runoff is medium, and the erosion hazard is severe.

This soil is well suited to row crops, hay, pasture, and small grain. Most areas have been cleared and cultivated but are now in pasture or meadow. Some fields are idle and are reverting to forest. (Capability unit IIIe–2, woodland group 3o7, wildlife group 4)

Pickwick Series

The Pickwick series consists of well-drained, moderately permeable soils that developed in alluvium washed from acid, loamy soils on uplands. These soils are on stream terraces. The slope range is 1 to 8 percent.

Representative profile of Pickwick silt loam, 3 to 8 percent slopes, eroded, in a moist pasture; SE¼NE¼NE¼ sec. 8, T. 10 N., R. 27 W.:

Ap—0 to 4 inches, brown (7.5YR 4/4) silt loam; weak, fine, granular structure; friable; many fine roots; few fine pores; medium acid; abrupt, smooth boundary. 4 to 8 inches thick.

B1—4 to 9 inches, yellowish-red (5YR 4/6) loam; weak, medium, subangular blocky structure; friable; few, thin, patchy clay films; common fine roots; common fine pores; very strongly acid; clear, smooth boundary. 4 to 10 inches thick.

B21t—9 to 36 inches, red (2.5YR 4/6) clay loam; moderate, medium, subangular blocky structure; firm; medium clay films on most peds and in pores; common fine roots; common fine pores; very strongly acid; gradual, wavy boundary. 18 to 36 inches thick.

B22t—36 to 50 inches, red (2.5YR 4/6) clay loam; common, medium, distinct, yellowish-brown and light yellowish-brown mottles; weak, fine, subangular blocky structure; firm; thin clay films on most peds and in pores; few fine roots; common fine pores; many worm tunnels; few, small, hard, dark-colored concretions; very strongly acid; gradual, smooth boundary. 12 to 30 inches thick.

B23t—50 to 72 inches +, variegated yellowish-red, yellowish-brown, pale-brown, and gray loam; weak, fine, subangular blocky structure; firm; common, thin, patchy clay films; common fine pores; many, small, hard, dark-colored concretions; very strongly acid. 0 to 24 inches thick.

The Ap horizon is brown, dark brown, dark yellowish brown, or dark grayish brown. In spots it is a mixture of material from the A and B horizons and is strong brown. The A2 horizon, where present, is brown or yellowish-brown silt loam or loam up to 7 inches thick. The B1 horizon is brown, strong-brown, reddish-brown, or yellowish-red loam silt loam, or clay loam. The B21t horizon is red or yellowish-red clay loam or silty clay loam. The B22t horizon is red or yellowish red or is variegated red, brown, and grayish brown. Its texture is loam, clay loam, or silty clay loam. The B23t horizon is fine sandy loam or loam. In places it is up to 20 percent gravel and cobblestones. The C horizon, up to several feet thick, is variegated red, brown, and gray loam or fine sandy loam and is up to 25 percent gravel and cobblestones. The depth to bedrock is more than 6 feet. The reaction is medium acid to strongly acid in the A horizon and strongly acid to very strongly acid in the B horizon.

Pickwick soils are associated with Cleora, Dubbs, Leadvale, Ora, and Taft soils. They are redder in the B horizon and are better drained than Ora, Leadvale, and Taft soils, and they do not have a fragipan, which is typical of those soils. They have a B horizon, which Cleora soils lack. The B horizon is finer textured, thicker, and more strongly developed than that in Dubbs soils. It is not so intensely mottled as that of Taft soils.

Pickwick silt loam, 1 to 3 percent slopes, eroded (PsB2).—This soil is on stream terraces. Most areas are between 5 and 120 acres in size. There are a few rills and shallow gullies. Spots of Leadvale and Ora soils are included in some mapped areas.

The surface layer of this Pickwick soil is brown, dark brown, dark yellowish brown, or dark grayish brown and is 4 to 10 inches thick. In spots the plow layer is a mixture of material from the surface layer and the subsoil and is strong brown. The subsoil is red or yellowish-red loam, clay loam, or silty clay loam 30 to 60 inches or more thick. The depth to bedrock is more than 6 feet.

This soil is strongly acid to very strongly acid. It is moderate in natural fertility. The response to lime and fertilizer is good. The root zone is 3 feet or more thick. Roots and water penetrate easily. The available water capacity is high. Runoff is medium, and the erosion hazard is moderate.

Hay, pasture, small grain, and corn are suitable crops. Orchards and vineyards also grow well. (Capability unit IIe–1, woodland group 3o7, wildlife group 6)

Pickwick silt loam, 3 to 8 percent slopes, eroded (PsC2).—This soil is on stream terraces. Most areas are between 5 and 400 acres in size. There are a few rills and shallow gullies. Spots of Leadvale and Ora soils are included in some mapped areas.

The surface layer of this Pickwick soil is brown, dark brown, dark yellowish brown, or dark grayish brown and is 4 to 10 inches thick. In spots the plow layer is a mixture of the surface layer and the subsoil and is strong brown. The subsoil is red or yellowish-red loam, clay loam, or silty clay loam 30 to 60 inches or more thick. The depth to bedrock is more than 6 feet.

This soil is strongly acid to very strongly acid. It is moderate in natural fertility. The response to lime and fertilizer is good. The root zone is 3 feet or more thick. Roots and water penetrate easily. The available water capacity is high. Runoff is medium, and the erosion hazard is severe.

Hay, pasture, small grain, and corn are suitable crops. Orchards and vineyards also grow well. (Capability unit IIIe–1, woodland group 3o7, wildlife group 6)

Rock Land

Rock land (Ro) consists of sandstone outcrops. It occurs along the margins of ridges and mountaintops, as nearly vertical bluffs 30 to 100 feet high, and as narrow bands around the margins of mountainside benches. Most areas are in the Boston Mountains. They are between 5 and 50 acres in size. The slope range is about 10 percent to nearly vertical. Most mapped areas include a few spots of Mountainburg and Montevallo soils.

The surface of this land type typically is bare sandstone rock but in scattered spots is gravelly or stony sandy loam a few inches thick.

This land type is poorly suited to any agricultural use. Vegetation is sparse. The major woody plants are redcedar, hawthorne, blackjack oak, and winged elm. Common native grasses that grow fairly well are little bluestem, skeletongrass, and perennial three-awn. (Capability unit VIIs–3, woodland group 5x8, wildlife group 10, Sandstone Ledge range site)

Taft Series

The Taft series consists of somewhat poorly drained soils that developed in old alluvium washed from acid,

loamy soils on uplands. These soils are on stream terraces. The slope range is 0 to 3 percent. Some areas are mounded.

Representative profile of Taft silt loam, 1 to 3 percent slopes, in a moist meadow; SE¼SW¼NW¼ sec. 8, T. 7 N., R. 28 W.:

Ap—0 to 5 inches, dark-brown (10YR 4/3) silt loam; moderate, fine, granular structure; friable; many fine roots; few fine pores; strongly acid; abrupt, smooth boundary. 3 to 7 inches thick.

B1—5 to 10 inches, dark-brown (10YR 4/3) silt loam; weak, medium, subangular blocky structure; friable; common fine roots; common fine pores; very strongly acid; clear, smooth boundary. 4 to 9 inches thick.

B2—10 to 15 inches, yellowish-brown (10YR 5/4) silt loam; few, medium, faint, grayish-brown mottles; moderate, medium, subangular blocky structure; firm; common fine roots; common fine pores; few, small, hard concretions; very strongly acid; clear, smooth boundary. 4 to 10 inches thick.

Bx1—15 to 22 inches, grayish-brown (2.5Y 5/2) silty clay loam; common, fine, distinct, yellowish-red and yellowish-brown mottles; moderate, medium, subangular blocky structure; firm, brittle; common medium clay films; few fine roots; common fine pores; few, fine, dark-brown concretions; very strongly acid; clear, smooth boundary. 5 to 10 inches thick.

Bx2—22 to 44 inches, grayish-brown (2.5Y 5/2) silty clay loam; common, medium, prominent, red and yellowish-red mottles; moderate, medium, subangular blocky structure; firm, brittle; continuous medium clay films; few fine roots; common fine and medium pores; few, fine, dark-brown concretions; thin coating of light-gray silt on some ped surfaces; very strongly acid; gradual, wavy boundary. 10 to 30 inches thick.

Bx3—44 to 58 inches, variegated gray (10YR 5/1), yellowish-brown (10YR 5/8), yellowish-red (5YR 4/8), and strong-brown (7.5YR 5/6) silty clay loam; weak, medium, subangular blocky structure; firm, brittle; common thin clay films; few fine roots; common fine pores; common, medium and fine, dark-brown concretions; 2 percent shale fragments; very strongly acid. 10 to 30 inches thick.

IIR—58 inches +, acid shale.

The Ap horizon is dark grayish brown, dark brown, or dark yellowish brown. The A2 horizon, where present, is grayish-brown, brown, light olive-brown, or yellowish-brown silt loam 3 to 5 inches thick. The B1 horizon is dark-brown, brown, grayish-brown, or yellowish-brown silt loam. In places, it has brown, yellowish-brown, or grayish-brown mottles. The B2 horizon is yellowish-brown, grayish-brown, or light brownish-gray silt loam or silty clay loam that has grayish-brown or yellowish-brown mottles or is variegated yellowish brown and grayish brown. The Bx horizon (fragipan) is grayish-brown, light brownish-gray, or gray silty clay loam or clay loam that has mottles of brown, gray, and red or is variegated gray, yellowish brown, and yellowish red. The C horizon, where present, is gray or variegated gray and yellowish-brown silty clay loam or silty clay. The depth to bedrock ranges from 4 to more than 8 feet. The depth to the Bx horizon ranges from 14 to 23 inches. The reaction is medium acid to strongly acid in the A horizon and strongly acid to very strongly acid in the B horizon.

Taft soils are associated with Falkner, Guthrie, Leadvale, Ora, Pickwick, and Wing soils. They are finer textured and more poorly drained than Ora soils. They are less clayey in the B horizon than Falkner soils and are more poorly drained and grayer in the fragipan than the moderately well drained Leadvale soils. They are more poorly drained than the well-drained Pickwick soils, which have a reddish B horizon. Taft soils are browner and better drained than Guthrie soils. They do not have the high content of sodium in the B horizon that is typical of Wing soils.

Taft complex, mounded (Tc).—This complex is on stream terraces. Most areas are between 5 and 80 acres in size. The soils are dominantly level or depressional. Rounded mounds make up 15 to 35 percent of each mapped area. They are 30 to 80 feet in diameter, 3 to 5 feet high, and 20 to 100 feet apart. Spots of Leadvale and Guthrie soils are included in some mapped areas.

The surface layer in areas between mounds is dark grayish-brown to dark yellowish-brown silt loam 3 to 7 inches thick. The upper part of the subsoil is dark-brown, brown, grayish-brown, or yellowish-brown silt loam or silty clay loam mottled with gray or brown. It is 8 to 19 inches thick. The lower part is a firm, brittle fragipan. It is grayish-brown or gray mottled with brown, gray, and red, and is silty clay loam or clay loam.

The surface layer on the mounds is dark grayish-brown or dark-brown silt loam 16 to 30 inches thick. The subsoil is brown, pale-brown, or yellowish-brown silt loam or silty clay loam mottled with grayish brown or brown.

These soils are strongly acid to very strongly acid. They are low in natural fertility. The response to lime and fertilizer is moderate. Roots and water easily penetrate as far down as the fragipan, which retards further penetration. The available water capacity is moderate. Runoff is slow, and wetness is a severe limitation.

Hay, pasture, and small grain are suitable crops. The mounds interfere somewhat with tillage and mowing operations. Surface drainage is needed. Most areas have been cleared and cultivated but are now in pasture and meadow. (Capability unit IVw–1, woodland group 3w8, wildlife group 4)

Taft silt loam, 0 to 1 percent slopes (TfA).—This soil is on stream terraces. Most areas are between 5 and 80 acres in size. Spots of Leadvale and Guthrie soils are included in some mapped areas.

The surface layer of this Taft soil is dark grayish brown, dark brown, or dark yellowish brown and is 3 to 7 inches thick. The upper part of the subsoil is dark-brown, brown, grayish-brown, or yellowish-brown silt loam or light silty clay loam mottled with gray or brown. It is 8 to 19 inches thick. The lower part is a firm, brittle fragipan. It is grayish-brown or gray silty clay loam or clay loam mottled with brown, gray, and red. It is 25 to 50 inches thick. Hard and soft, dark-colored concretions are few to common in the subsoil.

This soil is strongly acid to very strongly acid. It is low in natural fertility. The response to lime and fertilizer is moderate. Roots and water easily penetrate as far down as the fragipan, which retards further penetration. The available water capacity is moderate. Runoff is slow, and the wetness hazard is severe.

If adequately drained, this soil is suited to row crops, hay, pasture (fig. 12), and small grain. Surface drainage is needed for row crops. Most areas have been cleared and cultivated but are now in pasture and meadow. (Capability unit IIIw–1, woodland group 3w8, wildlife group 4)

Taft silt loam, 1 to 3 percent slopes (TfB).—This soil is on stream terraces. Most areas are between 5 and 100

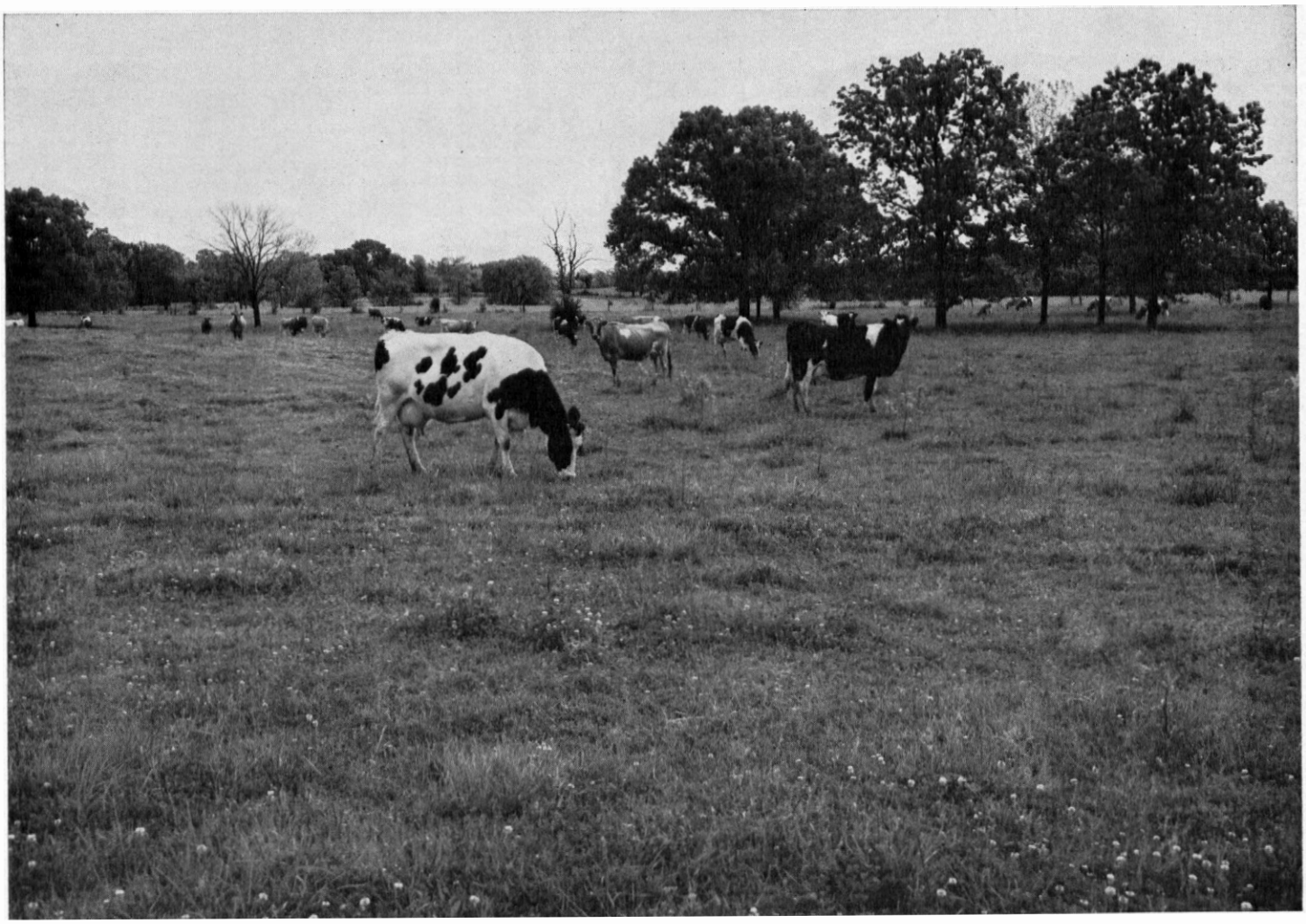

Figure 12.—Dairy cattle grazing bermudagrass and white clover on Taft silt loam, 0 to 1 percent slopes.

acres in size. Spots of Leadvale and Guthrie soils are included in some mapped areas.

The surface layer is dark grayish brown, dark brown, or dark yellowish brown and is 3 to 7 inches thick. The upper part of the subsoil is dark brown, brown, grayish brown, or yellowish brown mottled with gray or brown. It is silt loam or silty clay loam 8 to 19 inches thick. The lower part is a firm, brittle fragipan. It is mottled brown, gray, and red and is clay loam or silty clay loam 25 to 50 inches thick. Hard and soft, dark-colored concretions are few to common in the subsoil.

This soil is strongly acid to very strongly acid. It is low in natural fertility. The response to lime and fertilizer is moderate. Roots and water easily penetrate as far down as the fragipan, which retards further penetration. The available water capacity is moderate. Runoff is slow, and wetness is a severe limitation. Erosion is a slight hazard.

If adequately drained, this soil is suited to row crops, pasture, and small grain. Surface drainage is needed for row crops. Most areas have been cleared and cultivated but are now in pasture and meadow. (Capability unit IIIw-1, woodland group 3w8, wildlife group 4)

Wing Series

The Wing series consists of somewhat poorly drained to moderately well drained, very slowly permeable soils that developed in old alluvium or valley fill. The lower part of the B horizon is high in exchangeable sodium. These soils are on foot slopes and old stream terraces. The slope range is 1 to 3 percent.

Representative profile of Wing silt loam, in a moist pasture; NW¼NE¼NE¼ sec. 10, T. 7 N., R. 28 W.:

Ap—0 to 4 inches, dark-brown (10YR 4/3) silt loam; weak, medium, granular structure; friable; common fine roots; common fine pores; few very fine concretions; slightly acid; clear, smooth boundary. 3 to 5 inches thick.

A1—4 to 8 inches, dark-brown (10YR 4/3) silt loam; weak, fine, subangular blocky structure; friable; common fine roots; common fine pores; few very fine concretions; slightly acid; clear, smooth boundary. 0 to 6 inches thick.

B1—8 to 16 inches, yellowish-brown (10YR 5/4) silt loam; weak, medium, subangular blocky structure; firm; few fine roots; many fine pores; mildly alkaline; gradual, wavy boundary. 3 to 12 inches thick.

B2t—16 to 30 inches, yellowish-brown (10YR 5/6) silty clay; common, fine, distinct, gray mottles; columnar,

breaking to moderate, medium, subangular blocky structure; very firm; many, medium, dark-brown clay films; few fine roots; few fine pores; common, fine, hard, dark-brown concretions; strongly alkaline; gradual, wavy boundary. 12 to 30 inches thick.

B3—30 to 72 inches +, yellowish-brown (10YR 5/6) and light olive-brown (2.5Y 5/4) silty clay; common, fine, distinct, gray mottles; columnar, breaking to weak, medium, subangular blocky structure; thin interstratified layers of weathered shale; very strongly alkaline. 2 to several feet thick.

The A1 or Ap horizon is brown, dark brown, or dark grayish brown. The B1 horizon is brown or yellowish-brown silt loam or silty clay loam. The B2t horizon is grayish-brown, brown, or yellowish-brown silty clay or silty clay loam that has gray mottles or is variegated gray and brown. This horizon is more than 35 percent clay. The depth to shale bedrock is 4 to more than 6 feet. The depth to the alkaline horizon is 4 to 15 inches. The reaction is neutral to strongly acid in the A horizon and mildly alkaline to very strongly alkaline in the B horizon.

Wing soils are associated with Falkner, Guthrie, Leadvale, Ora, and Taft soils. They have a finer textured B horizon than all except Falkner soils. They have an alkaline B horizon high in sodium and magnesium saturation, which the associated soils do not have.

Wing silt loam (Wg).—This soil is on foot slopes and old stream terraces. Most areas are between 2 and 25 acres in size. Spots of Falkner, Leadvale, and Taft soils are included in some mapped areas.

The surface layer of this Wing soil is dark brown, dark grayish brown, or brown and is 3 to 10 inches thick. The subsoil is grayish-brown, brown, or yellowish-brown silty clay loam or silty clay that has gray mottles or is variegated gray and brown. It is 3 to more than 5 feet thick.

This soil is very strongly alkaline. It is low in natural fertility. Roots and water easily penetrate to a depth of 4 to 15 inches, but further penetration is very seriously restricted by the subsoil. The available water capacity is low. Runoff is rapid, and the erosion hazard is severe.

Most areas have been cleared and cultivated but are now in hay or pasture. The subsoil is high in exchangeable sodium, and this limits the kinds of plants that will grow. If organic matter is added, hay and pasture crops can be grown. (Capability unit VIs–2; woodland group 5t0; wildlife group 12; Alkali Flats range site)

Use of the Soils for Crops and Pasture [2]

Most of the cleared areas in Franklin County are used for small grain, pasture, and range. Some are idle. Small acreages are in orchards, vineyards, and truck farms, all of which are important enterprises in the county. Only a small acreage is used for row crops.

In general, the soils in this county are low in nitrogen, calcium, potassium, phosphorus, and organic material. Most of those suitable for cultivation are erodible. Crops that return large amounts of residue to the soil annually, adequate amounts of manure or commercial fertilizer, lime where needed, and good tillage methods are all important factors in management. Contour cultivation, terraces, and vegetated waterways are needed on sloping soils that are used intensively for clean-tilled crops, and row arrangement and suitable drainage are needed for dependable production in wet areas.

Cover crops or grasses and legumes should be grown regularly if the erosion hazard is severe or if the crops grown leave only small amounts of residue. The residue should be shredded and distributed evenly to provide protective cover and active organic material.

The amount of fertilizer to be applied is generally determined by soil tests, the kinds of crops to be grown, and past experiences with fertilization and crops. Periodic applications of agricultural limestone are beneficial and in places are necessary for satisfactory production of such crops as alfalfa and white clover.

A plowpan commonly develops in sandy and silty soils that are improperly tilled or are tilled frequently with heavy equipment. Formation of a plowpan can be prevented by keeping tillage to a minimum, varying the depth of tillage, and tilling at a favorable moisture content. Growing deep-rooted grasses and legumes is beneficial. Such practices also help in preventing the formation of a pan. If left bare, most soils tend to crust and pack during periods of heavy rainfall. Growing cover crops and managing crop residue help in preserving tilth.

Perennial grasses or legumes or mixtures of these are grown for pasture and hay. The mixtures generally consist of either a summer or a winter perennial grass and a suitable legume.

Coastal bermudagrass, common bermudagrass, dallisgrass, and bahiagrass are the summer perennials most commonly grown. Coastal bermudagrass and bahiagrass are fairly new to this county, but both are highly satisfactory in production of good-quality forage. Johnsongrass is also suited to many of the soils in the county. Fescue, the chief winter perennial grass now grown in the county, grows only on fertile soils that have a favorable soil-moisture relationship. All of these grasses respond well to fertilizers and particularly to nitrogen.

White clover, alfalfa, vetch, crimson clover, annual lespedeza (fig. 13), and sericea lespedeza are the most commonly grown legumes.

Proper grazing is essential for the production of high-quality forage, for stand survival, and for erosion control. Also essential are brush and weed control, fertilization, rotation grazing, and renovation of the pasture.

Capability Groups of Soils

Capability classification is the grouping of soils to show, in a general way, their suitability for most kinds of farming. It is a practical classification based on the limitations of the soils, the risk of damage when they are used, and the way they respond to treatment. The classification does not apply to most horticultural crops or to rice and other crops that have special requirements. The soils are classified according to degree and kind of permanent limitation, but without consideration of major and generally expensive alterations in the slope, depth, or other characteristics of the soils; and without consideration of possible but unlikely major reclamation projects.

[2] W. Wilson Ferguson, management agronomist, Soil Conservation Service, helped prepare this section.

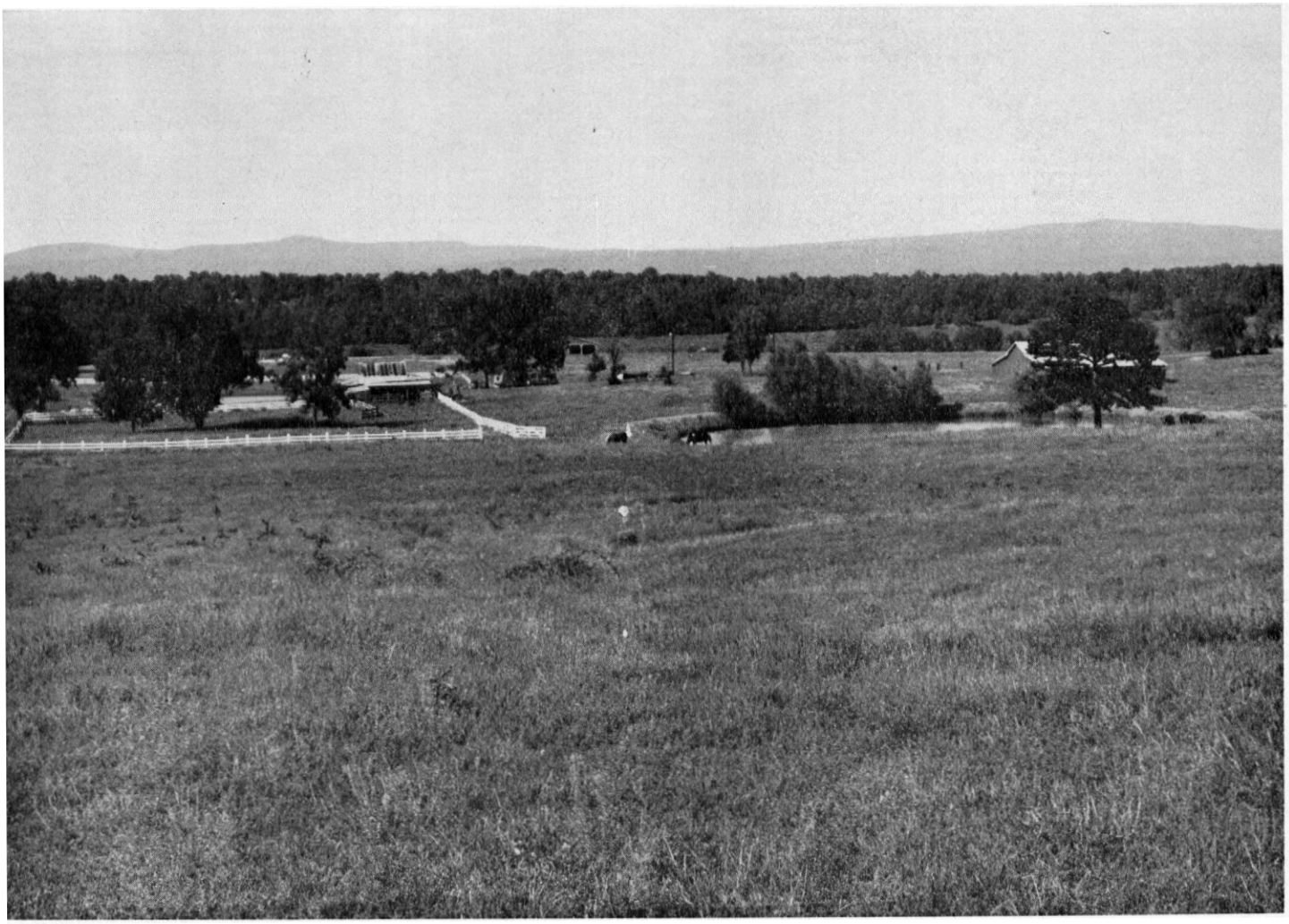

Figure 13.—**Lespedeza and bermudagrass pasture on Allen gravelly fine sandy loam, 3 to 8 percent slopes. Farm pond is on Leadvale silt loam, 1 to 3 percent slopes.**

In the capability system, all the soils are grouped at three levels: the capability class, the subclass, and the unit. These are discussed in the following paragraphs.

Capability Classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use, defined as follows:

Class I. Soils have few limitations that restrict their use.

Class II. Soils have moderate limitations that reduce the choice of plants or require moderate conservation practices.

Class III. Soils have severe limitations that reduce the choice of plants, require special conservation practices, or both.

Class IV. Soils have very severe limitations that restrict the choice of plants, require very careful management, or both.

Class V. Soils are subject to little or no erosion but have other limitations, impractical to remove, that limit their use largely to pasture or range, woodland, or wildlife food and cover.

Class VI. Soils have severe limitations that make them generally unsuited to cultivation and limit their use largely to pasture or range, woodland, or wildlife food and cover.

Class VII. Soils have very severe limitations that make them unsuited to cultivation and restrict their use largely to pasture or range, woodland, or wildlife food and cover.

Class VIII. Soils and landforms have limitations that preclude their use for commercial plant production and restrict their use to recreation, wildlife, or water supply, or to esthetic purposes. There are no class VIII soils in Franklin County.

Capability Subclasses are soil groups within one class; they are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is

limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is too cold or too dry.

In class I there are no subclasses, because the soils of this class have few limitations. Class V can contain, at the most, only subclasses identified by *w*, *s*, and *c*, because the soils in it are subject to little or no erosion, though they have other limitations that restrict their use largely to pasture, range, woodland, wildlife, or recreation.

CAPABILITY UNITS are soil groups within the subclasses. The soils in one capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity and other responses to management. Thus, the capability unit is a convenient grouping for making many statements about management of soils. Capability units are generally designated by adding Arabic numerals to the subclass symbol, for example, IIe–3 or IIIw–1. Thus, in one symbol, the Roman numeral designates the capability class, or degree of limitation; the small letter indicates the subclass, or kind of limitation, as defined in the foregoing paragraphs; and the Arabic numeral specifically identifies the capability unit.

In the following pages each of the capability units in Franklin County is described, and suggestions for use and management are given. The names of the soil series represented are mentioned in the description of each unit, but this does not mean that all the soils of a given series are in the unit. The capability unit designation for each soil in the county can be found in the "Guide to Mapping Units."

Capability unit I–1

This unit consists of soils of the Caspiana, Cleora, Dubbs, and Morganfield series. These are well-drained soils that formed in alluvium along streams. The slope is dominantly 0 to 1 percent but ranges up to 3 percent. The surface layer is friable fine sandy loam to silt loam. The subsoil is friable sandy loam to clay loam. These soils make up about 1.9 percent of the county.

Natural fertility is medium, and the response to lime and fertilizer is good. The reaction is medium acid to strongly acid. The available water capacity is moderate. Permeability is moderate; no layer restricts movement of roots and water. The root zone is 4 feet or more thick.

These soils are well suited to all cultivated crops and pasture plants commonly grown in the county. Suitable crops include cotton (fig. 14), corn, cowpeas, cucumbers, strawberries, tomatoes, vetch, soybeans, and small grain. The most suitable pasture plants are bermudagrass, bahiagrass, tall fescue, sericea lespedeza, johnsongrass, white clover, crimson clover, and annual lespedeza.

Occasional overflow is a hazard. Runoff is medium, and the erosion hazard is slight. Plowpans form readily. If proper tillage and adequate fertilization are practiced, cultivated crops that leave large amounts of residue can be grown year after year. Soil-improving grasses, legumes, or cover crops must be included if the cropping system consists predominantly of low-residue crops.

Capability unit IIe–1

This unit consists of soils of the Hartsells, Linker, and Pickwick series. These are moderately deep to deep, well-drained soils that formed on uplands or in old alluvium on terraces. The slope range is 1 to 3 percent. The surface layer is friable fine sandy loam or silt loam. The subsoil is sandy clay loam, loam, or silty clay loam. These soils make up about 2.7 percent of the county.

Natural fertility is medium to low, and the response to lime and fertilizer is good. The reaction is strongly acid to very strongly acid. Permeability is moderate, and the available water capacity is medium to high. The root zone is about 20 to 48 inches thick.

Cotton, corn, cowpeas, grain sorghum, soybeans, Irish potatoes, tomatoes, sweetpotatoes, beans, blackberries, strawberries, vetch, and small grain are suitable crops. Bermudagrass, bahiagrass, weeping lovegrass, crimson clover, annual lespedeza, and sericea lespedeza are suitable pasture plants.

Runoff is medium, and the erosion hazard is moderate. If proper tillage, terracing, contour cultivation, and adequate fertilization are practiced, row crops that leave large amounts of residue can be grown year after year. No special management is needed if sown crops that leave large amounts of residue are grown year after year. Soil-improving grasses, legumes, or cover crops must be included if the cropping system consists predominantly of low-residue crops.

Capability unit IIe–2

The one soil in this unit, Leadvale silt loam, 1 to 3 percent slopes, is deep and moderately well drained. It formed in old alluvium on stream terraces. The surface layer is friable silt loam. The subsoil is silt loam, silty clay loam, or clay loam. At a depth of 15 to 26 inches is a compact, brittle fragipan. This soil makes up about 3.8 percent of the county.

Natural fertility is low, and the response to lime and fertilizer is good. The reaction is slightly acid to strongly acid. Permeability is slow, and the available water capacity is moderate. Roots penetrate as far down as the fragipan.

Cotton, corn, soybeans, grain sorghum, and small grain are suitable crops. Bermudagrass, tall fescue, bahiagrass, weeping lovegrass, crimson clover, annual lespedeza, and sericea lespedeza are suitable pasture plants.

Runoff is medium, and the erosion hazard is moderate. If proper tillage, terracing, contour cultivation, and adequate fertilization are practiced, row crops that leave large amounts of residue can be grown year after year. No special management is needed if sown crops that return large amounts of residue are grown year after year. Soil-improving grasses, legumes, or cover crops must be included if the cropping system consists predominantly of low-residue crops.

Capability unit IIe–3

The one soil in this unit, Muskogee silt loam, 1 to 3 percent slopes, is a deep, moderately well drained soil on uplands. It formed in old alluvium deposited by the Arkansas River. The surface layer is friable silt loam.

Figure 14.—Cotton on Caspiana silt loam.

The upper part of the subsoil is firm silty clay loam. The lower part is plastic clay or silty clay. This soil makes up about 0.2 percent of the county.

Natural fertility is low, and the response to lime and fertilizer is good. The reaction is strongly acid to very strongly acid. The available water capacity is moderate. Permeability is very slow because of the clayey subsoil, which restricts movement of water and roots.

Cotton, corn, grain sorghum, small grain, soybeans, sweetpotatoes, tomatoes, cucumbers, and vetch are suitable crops. Bermudagrass, bahiagrass, tall fescue, weeping lovegrass, crimson clover, white clover, annual lespedeza, and sericea lespedeza are suitable pasture plants.

Runoff is medium, and the erosion hazard is moderate. If proper tillage, terracing, contour cultivation, and adequate fertilization are practiced, row crops that leave large amounts of residue can be grown year after year. No special management is needed if sown crops that leave large amounts of residue are grown year after year. Soil-improving grasses, legumes, or cover crops must be included if the cropping system consists predominantly of low-residue crops.

Capability unit IIe-4

This unit consists of soils of the Cleora and Dubbs series. These are deep, well-drained soils that formed in alluvium. The slope range is 1 to 3 percent. The surface layer is friable fine sandy loam, very fine sandy loam, or silt loam. The subsoil is friable sandy loam to clay loam. These soils make up about 1.5 percent of the county.

Natural fertility is moderate to high, and the response to lime and fertilizer is good. The reaction is mildly alkaline to very strongly acid. The available water capacity is moderate. Permeability is moderate; no layer restricts movement of water or roots. The root zone is 4 feet or more thick.

Cotton, corn, vetch, small grain, grain sorghum, sweetpotatoes, cucumbers, and tomatoes are the most suitable crops. Bermudagrass, fescue, bahiagrass, johnsongrass, crimson clover, white clover, alfalfa, sericea lespedeza, and annual lespedeza are the most suitable pasture plants.

Occasional overflow is a hazard. Runoff is medium, and the erosion hazard is slight to moderate. If proper

tillage, cross-slope cultivation, and adequate fertilization are practiced, clean-tilled crops that leave large amounts of residue can be grown year after year. No special management is needed if sown crops that leave large amounts of residue are grown year after year. Soil-improving grasses, legumes, or cover crops must be included if the cropping system consists predominantly of low-residue crops.

Capability unit IIw–1

The one soil in this unit, Moreland silty clay loam, is a deep, moderately well drained, very slowly permeable soil on flood plains along the Arkansas River. The slope is 0 to 1 percent. The subsoil is silty clay to clay. This soil makes up about 0.2 percent of the county.

Natural fertility is moderate to high, and the response to lime and fertilizer is good. The reaction is neutral to medium acid. Permeability is very slow, and the available water capacity is moderate. The root zone is 48 to 60 inches deep.

Cotton, soybeans, corn, small grain, vetch, and alfalfa are the most suitable crops. Bermudagrass, tall fescue, johnsongrass, annual lespedeza, bahiagrass, and white clover are the most suitable pasture plants.

Runoff is slow. Excess water is a moderate limitation. If proper tillage, adequate fertilization, and adequate drainage, including row arrangement, are practiced, cultivated crops that leave large amounts of residue can be grown year after year. Soil-improving grasses, legumes, or cover crops must be included if the cropping system consists predominantly of low-residue crops.

Capability unit IIIe–1

This unit consists of soils of the Allen, Hartsells, Linker, and Pickwick series. These are moderately deep to deep, well-drained soils on uplands and stream terraces. The slope range is 1 to 8 percent. The surface layer is friable gravelly fine sandy loam, fine sandy loam, or silt loam. The subsoil is sandy clay loam, loam, or silty clay loam. These soils make up about 12.8 percent of the county.

Natural fertility is moderate to low, and the response to lime and fertilizer is moderate to good. The reaction is medium acid to very strongly acid. Permeability is moderate, and the available water capacity is moderate to high. The root zone is 20 to 48 inches or more thick.

Cotton, corn, vetch, small grain, grain sorghum, sweetpotatoes, cucumbers, tomatoes, peaches, and strawberries are suitable crops. Bermudagrass, bahiagrass, weeping lovegrass, annual lespedeza, sericea lespedeza, and crimson clover are suitable pasture plants.

Runoff is medium, and the erosion hazard is severe. If proper tillage, terracing, contour farming, and adequate fertilization are practiced, clean-tilled crops that leave large amounts of residue can be grown year after year on the lower slopes. Conservation practices need to be intensified as the gradient and length of slope and the erosion hazard increase. Soil-improving grasses, legumes, or cover crops must be included if the cropping system consists predominantly of low-residue crops.

Capability unit IIIe–2

This unit consists of soils of the Leadvale and Ora series. These are deep, moderately well drained soils on stream terraces, benches, and foot slopes. They formed in old alluvium and colluvium derived from acid sandstone and shale. The slope range is 3 to 8 percent. The surface layer is friable silt loam or fine sandy loam. The subsoil is loam, clay loam, or silty clay loam. A compact, brittle fragipan begins at a depth of 18 to 36 inches. These soils make up about 4 percent of the county.

Natural fertility is low, and the response to lime and fertilizer is moderate to good. The reaction is slightly acid to very strongly acid. The available water capacity is moderate. Permeability is slow because of the fragipan, which restricts movement of water and roots.

Cotton, corn, grain sorghum, small grain, and vetch are suitable crops. Bermudagrass, bahiagrass, tall fescue, johnsongrass, weeping lovegrass, crimson clover, white clover, annual lespedeza, and sericea lespedeza are suitable pasture plants.

Runoff is medium, and the erosion hazard is severe. If proper tillage, terracing, contour farming, and adequate fertilization are practiced, clean-tilled crops that leave large amounts of residue can be grown year after year on the lower slopes. Conservation practices need to be intensified as the gradient and length of slope and the erosion hazard increase. Soil-improving grasses, legumes, or cover crops must be included if the cropping system consists predominantly of low-residue crops.

Capability unit IIIe–3

The one soil in this unit, Muskogee silt loam, 3 to 8 percent slopes, is a deep, moderately well drained, upland soil that formed in old alluvium on terraces along the Arkansas River. The surface layer is friable silt loam. The upper part of the subsoil is firm silty clay loam. The lower part is plastic clay or silty clay. This soil makes up about 0.4 percent of the county.

Natural fertility is low, and the response to lime and fertilizer is moderate to good. The reaction is strongly acid to very strongly acid. The available water capacity is moderate. Permeability is very slow because of the clayey subsoil, which restricts penetration of water and roots.

Cotton, grain sorghum, small grain, and vetch are suitable crops. Bermudagrass, bahiagrass, tall fescue, weeping lovegrass, annual lespedeza, sericea lespedeza, crimson clover, and white clover are suitable pasture plants.

Runoff is medium, and the erosion hazard is severe. If proper tillage, terracing, contour farming, and adequate fertilization are practiced, clean-tilled crops that leave large amounts of residue can be grown year after year on the lower slopes. Conservation practices need to be intensified as the gradient and length of slope and the erosion hazard increase. Soil-improving grasses, legumes, or cover crops must be included if the cropping system consists predominantly of low-residue crops.

Capability unit IIIe–4

The one soil in this unit, Mountainburg gravelly fine sandy loam, 1 to 3 percent slopes, is a shallow, well-drained, upland soil that formed in residuum derived from acid sandstone. The surface layer and the subsoil are gravelly fine sandy loam. The depth to sandstone

bedrock is 12 to 20 inches. This soil makes up about 0.2 percent of the county.

Natural fertility is low, and the response to lime and fertilizer is moderate. The reaction is strongly acid to very strongly acid. The available water capacity is low. The root zone is less than 20 inches thick. Droughtiness causes severe crop damage.

The crops preferable for planting are those that mature in spring or early in summer or are drought resistant. Grain sorghum and small grain are suitable cultivated crops. Bermudagrass, bahiagrass, weeping lovegrass, crimson clover, and sericea lespedeza are suitable pasture plants.

Runoff is medium, and the erosion hazard is severe. If proper tillage, terracing, contour farming, and adequate fertilization are practiced, cultivated crops that leave large amounts of residue can be grown year after year. Soil-improving crops must be included if the cropping system consists predominantly of low-residue crops.

Capability unit IIIw–1

This unit consists of soils of the Falkner, Leadvale, and Taft series. These are deep, moderately well drained to somewhat poorly drained soils that formed in residuum and old alluvium in valleys and along streams. The slope range is less than 3 percent. The surface layer is friable silt loam. The upper part of the subsoil is silt loam, silty clay loam, or clay loam. The lower part of Leadvale and Taft soils is a compact, brittle fragipan. In some soils the pan is silt loam or silty clay loam and is at a depth of 14 to 26 inches. In others it is silty clay or clay and is at a depth of 13 to 31 inches. Low mounds occupy up to 20 percent of some areas. These soils make up about 5.2 percent of the county.

Natural fertility is moderate to low, and the response to lime and fertilizer is good. The reaction is medium acid to very strongly acid. The available water capacity is moderate.

If these soils are drained, the most suitable crops are soybeans, grain sorghum, small grain, and vetch. Cotton is fairly well suited. The most suitable pasture plants are bermudagrass, tall fescue, bahiagrass, annual lespedeza, and white clover.

Runoff is slow, and wetness is a severe hazard. If proper tillage, adequate fertilization, and adequate drainage, including row arrangement, are practiced, cultivated crops that leave large amounts of residue can be grown year after year in the level to nearly level areas. Additional practices, including contour cultivation or cross-slope farming, are needed on the mounds. Soil-improving grasses, legumes, or cover crops must be included if the cropping system consists predominantly of low-residue crops.

Capability unit IIIw–2

This unit consists of soils of the Iberia and Muldrow series. These are deep, very slowly permeable soils on the flood plain of the Arkansas River. The slope is less than 1 percent. The surface layer is clay or silt loam. The subsoil is plastic clay. These soils make up about 0.6 percent of the county.

Natural fertility is moderate to high, and the response to fertilizer is good. The reaction is slightly acid to strongly acid. Permeability is very slow, and the available water capacity is moderate.

Cotton, grain sorghum, and small grain are the most suitable crops. Bermudagrass, tall fescue, annual lespedeza, and white clover are the most suitable pasture plants.

Runoff is slow. Wetness is a severe hazard. If adequate fertilization, proper tillage, and adequate drainage, including row arrangement, are practiced, cultivated crops that leave large amounts of residue can be grown year after year. Soil-improving grasses, legumes, or cover crops must be included if the cropping system consists predominantly of low-residue crops.

Capability unit IIIs–1

The one soil in this unit, Bruno loamy fine sand, is a deep, excessively drained soil on flood plains. The slope range is 0 to 2 percent. The surface is undulating and irregular in places. The texture of the underlying material is loamy fine sand or fine sand. This soil makes up about 0.7 percent of the county.

Natural fertility is low, and the response to lime and fertilizer is moderate to poor. The reaction is neutral to medium acid. Permeability is rapid, and the available water capacity is low. The root zone is deep.

This soil is of limited suitability for cultivated crops; the most suitable ones are early truck crops, grain sorghum, and small grain. Soybeans and cotton are fairly well suited. The most suitable pasture plants are weeping lovegrass and sericea lespedeza.

Runoff is slow. Occasional overflow and scouring are hazards. The low available water capacity is the chief limitation. If adequate fertilization and proper tillage are practiced, cultivated crops that leave large amounts of residue can be grown year after year. Soil-improving grasses, legumes, or cover crops must be included if the cropping system consists predominantly of low-residue crops. Stripcropping is needed in areas where soil blowing is a hazard.

Capability unit IVe–1

This unit consists of soils of the Allen and Linker series. These are moderately deep to deep, well-drained soils on uplands. The slope range is 8 to 12 percent. The surface layer is friable fine sandy loam or gravelly fine sandy loam. The subsoil is sandy clay loam or clay loam. These soils make up about 0.6 percent of the county.

Natural fertility is low, and the response to lime and fertilizer is moderate to good. The reaction is medium acid to very strongly acid. Permeability is moderate, and the available water capacity is moderate. The root zone is 20 to 48 inches or more thick.

These soils are of limited suitability for cotton, soybeans, grain sorghum, and other row crops. The most suitable crop is sown small grain. Suitable pasture grasses are bermudagrass, bahiagrass, weeping lovegrass, crimson clover, annual lespedeza, and sericea lespedeza.

Runoff is rapid, and the erosion hazard is very severe. Row crops can be grown occasionally if stripcropping is practiced and the cropping system includes grasses and legumes. Sown crops can be grown if contour tillage is practiced and the cropping system consists predominantly of grasses and legumes.

Capability unit IVe–2

The one soil in this unit, Allen stony fine sandy loam, 8 to 12 percent slopes, is a deep, well-drained soil on uplands. Its surface layer is friable. Its subsoil is friable stony sandy clay loam or stony clay loam. This soil makes up about 0.2 percent of the county.

Natural fertility is low, and the response to lime and fertilizer is moderate. The reaction is medium acid to very strongly acid. Permeability is moderate, and the available water capacity is moderate. The root zone is 48 inches or more thick.

This soil is of limited suitability for cotton, soybeans, grain sorghum, and other row crops. The most suitable crop is sown small grain. Suitable pasture plants are bermudagrass, bahiagrass, weeping lovegrass, crimson clover, annual lespedeza, and sericea lespedeza.

Runoff is rapid, and the erosion hazard is very severe. Row crops can be grown occasionally if stripcropping is practiced and the cropping system includes grasses and legumes. Sown crops can be grown if contour tillage is practiced and the cropping system consists predominantly of grasses and legumes. Stones interfere with the use of farm machinery.

Capability unit IVe–3

The one soil in this unit, Leadvale loam, 8 to 12 percent slopes, eroded, is a deep, moderately well drained soil that has a fragipan. This soil formed in colluvium on foot slopes. The surface layer is friable loam. The subsoil is silt loam, clay loam, or silty clay loam. A compact, brittle fragipan begins at a depth of 15 to 26 inches. This soil makes up about 0.3 percent of the county.

Natural fertility is low, and the response to lime and fertilizer is moderate. The reaction is medium acid to strongly acid. The available water capacity is moderate. Permeability is slow because of the fragipan, which restricts movement of water and roots.

This soil is of limited suitability for cotton, soybeans, and grain sorghum. The most suitable crop is sown small grain. Suitable pasture plants are bermudagrass, bahiagrass, weeping lovegrass, crimson clover, annual lespedeza, and sericea lespedeza.

Runoff is rapid, and the erosion hazard is very severe. Row crops can be grown occasionally if stripcropping is practiced and the cropping system consists predominantly of grasses and legumes. Sown crops can be grown if contour tillage is practiced and the cropping system consists predominantly of grasses or legumes.

Capability unit IVe–4

This unit consists of soils of the Enders and McKamie series. These are deep, well-drained soils on uplands and on terraces along the Arkansas River. The slope range is 3 to 8 percent. The surface layer is friable silt loam or gravelly silt loam. The subsoil is plastic clay, silty clay, or sandy clay. These soils make up about 0.7 percent of the county.

Natural fertility is low, and the response to lime and fertilizer is moderate. The available water capacity is moderate. Permeability is very slow; the plastic clay subsoil retards movement of roots and water. The root zone is 3 feet or more thick.

These soils are of limited suitability for cotton, soybeans, grain sorghum, and other row crops. The most suitable crop is small grain. Suitable pasture plants are bermudagrass, bahiagrass, weeping lovegrass, annual lespedeza, and sericea lespedeza.

Runoff is rapid, and the erosion hazard is very severe. Row crops can be grown occasionally if stripcropping is practiced and the cropping system includes grasses and legumes. Sown crops can be grown if contour tillage is practiced and the cropping system consists predominantly of grasses and legumes.

Capability unit IVe–5

This unit consists of soils of the Montevallo and Mountainburg series. These are shallow, well-drained and somewhat excessively drained, upland soils that formed in residuum derived from acid sandstone and shale. The slope range is 1 to 8 percent. The surface layer is gravelly or stony, friable fine sandy loam or silt loam. The subsoil is gravelly or stony fine sandy loam to silty clay. The depth to bedrock is 10 to 20 inches. These soils make up about 11.4 percent of the county.

Natural fertility is low, and the response to lime and fertilizer is moderate to poor. The reaction is strongly acid to very strongly acid. The available water capacity is low. The root zone is less than 20 inches thick.

These soils are of limited suitability for crops. The most suitable crops are grain sorghum and small grain. Suitable pasture plants are bermudagrass (fig. 15), bahiagrass, weeping lovegrass, and sericea lespedeza.

Runoff is rapid, and the erosion hazard is very severe. Droughtiness is a limitation. Row crops can be grown occasionally if terracing and contour cultivation are practiced and the cropping system includes grasses and legumes. Sown crops can be grown if contour tillage is practiced and the cropping system consists predominantly of grasses or legumes.

Capability unit IVw–1

This unit consists of soils of the Falkner, Guthrie, and Taft series. These are deep, poorly drained and somewhat poorly drained soils that formed in old alluvium or in residuum derived from shale. The slope range is dominantly 0 to 1 percent. Low, dome-shaped mounds make up 15 to 35 percent of some areas. The surface layer is friable silt loam. The subsoil is either silty clay to clay or a compact, brittle fragipan of silt loam to silty clay loam. These soils make up about 1.6 percent of the county.

Natural fertility is low to moderate, and the response to lime and fertilizer is good. The reaction is strongly acid to very strongly acid. The available water capacity is moderate. Permeability is slow or very slow because of the pan.

These soils are of limited suitability for crops. The most suitable crop is small grain. Suitable pasture plants are bermudagrass, tall fescue, white clover, and annual lespedeza.

Runoff is very slow, and wetness is a very severe hazard. Cultivated crops can be grown if proper tillage, adequate fertilization, and adequate drainage are practiced and soil-improving grasses and legumes are grown about half the time in the rotation.

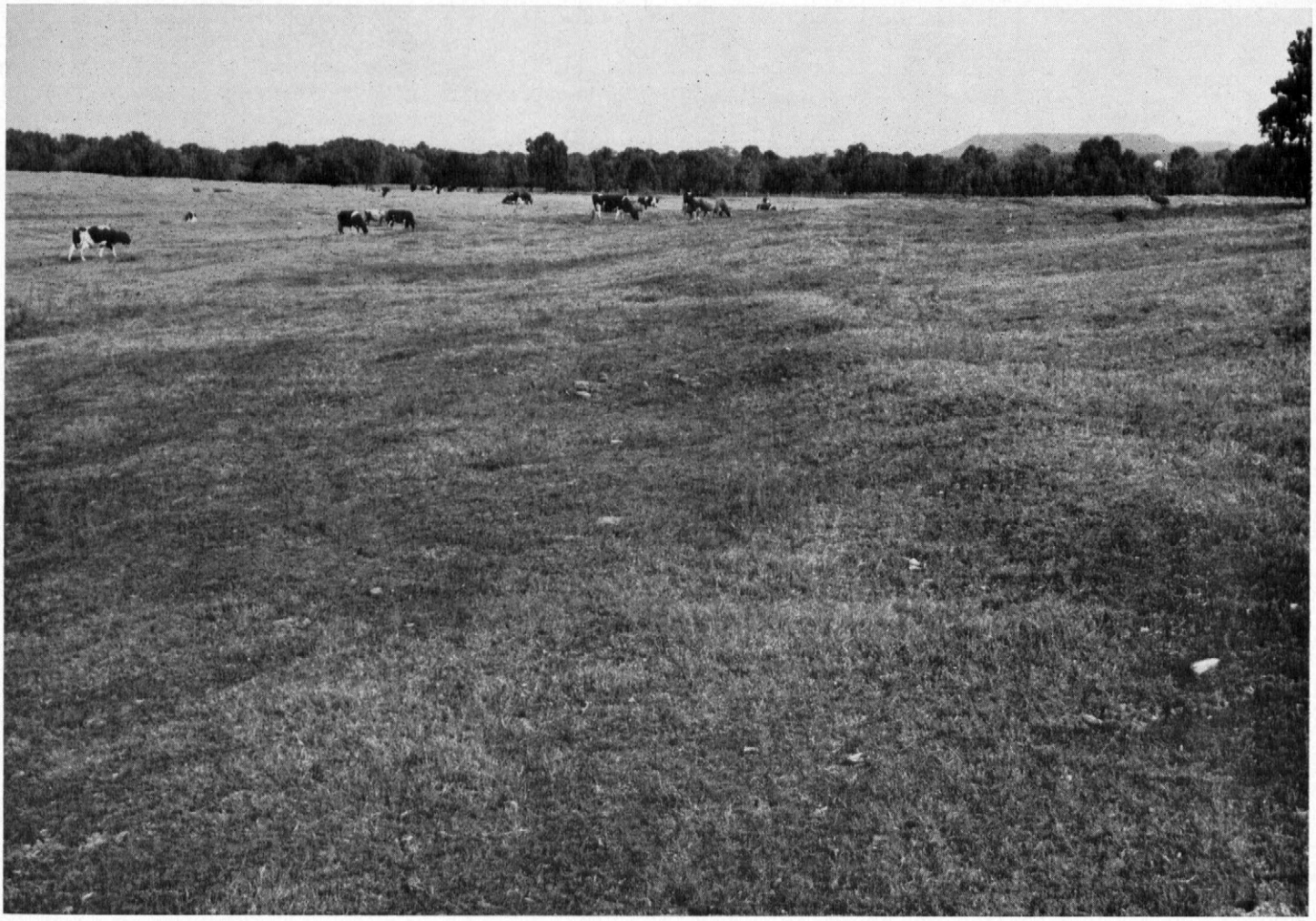

Figure 15.—**Bermudagrass pasture on Mountainburg gravelly fine sandy loam, 3 to 8 percent slopes. This soil is in capability unit IVe–5.**

Capability unit Vw–1

This unit consists of soils of the Bruno, Iuka, and Guthrie series. These are deep, poorly drained to excessively drained soils along streams. The slope is chiefly less than 1 percent; some areas are undulating. The texture of the surface layer ranges from silt loam to loamy sand. These soils make up about 2.5 percent of the county.

Natural fertility is moderate to low, and the response to lime and fertilizer is moderate to low. Permeability is very slow to rapid.

These soils are not suitable for cultivated crops. The most suitable pasture plants are bermudagrass, johnsongrass, and annual lespedeza.

Runoff is very slow to moderate. Frequent overflow is the chief limitation. These soils can be used as pasture, woodland, and wildlife habitat.

Capability unit VIe–1

This unit consists of soils of the Allen, Holston, and Linker series. These are deep and moderately deep soils on uplands. They occur mainly in the mountainous northern part of the county. The slope range is 8 to 20 percent. The surface layer is stony or gravelly silt loam, loam, or fine sandy loam. The subsoil is gravelly or stony silt loam, clay loam, loam, or sandy clay loam. These soils make up about 4.4 percent of the county.

Natural fertility is moderate to low, and the response to lime and fertilizer is moderate. The reaction is medium acid to very strongly acid. Permeability is moderate, and the available water capacity is moderate. In most places the root zone is more than 4 feet thick.

These soils are not suitable for clean-tilled crops. The most suitable pasture plants are bermudagrass, bahiagrass, weeping lovegrass, crimson clover, vetch, annual lespedeza, and sericea lespedeza.

Runoff is rapid, and the erosion hazard is severe. These soils can be used as pasture, woodland, and wildlife habitat.

Capability unit VIe–2

This unit consists of soils of the Enders series. These are deep, well-drained soils on uplands. They occur mainly in the mountainous northern part of the county. The slope range is 8 to 20 percent. The surface layer is friable silt loam or gravelly or stony silt loam. The subsoil is plastic clay. These soils make up about 2.8 percent of the county.

Natural fertility is low, and the response to lime and fertilizer is moderate. The reaction is strongly acid to very strongly acid. The available water capacity is moderate. Permeability is very slow. The root zone is 3 to 6 feet thick. The plastic clay subsoil restricts movement of water and roots.

These soils are not suitable for clean-tilled crops. The most suitable pasture plants are bermudagrass, bahiagrass, weeping lovegrass, crimson clover, vetch, annual lespedeza, and sericea lespedeza.

Runoff is rapid, and the erosion hazard is severe. These soils can be used as pasture, woodland, and wildlife habitat.

Capability unit VIe–3

The one soil in this unit, Mountainburg gravelly fine sandy loam, 8 to 12 percent slopes, is a shallow, well-drained soil on uplands. This soil formed in residuum derived from acid sandstone. The surface layer and the subsoil are gravelly fine sandy loam. The depth to bedrock is 12 to 20 inches. This soil makes up about 0.6 percent of the county.

Natural fertility is low, and the response to lime and fertilizer is poor. The reaction is strongly acid to very strongly acid. The available water capacity is low. The root zone is 12 to 20 inches thick.

This soil is not suitable for clean-tilled crops but is suitable for bermudagrass, bahiagrass, weeping lovegrass, crimson clover, vetch, and sericea lespedeza.

Runoff is rapid, and the erosion hazard is severe. The shallow root zone, the low fertility, and the low available water capacity are among the chief limitations. This soil can be used as pasture, rangeland, woodland, and wildlife habitat.

Capability unit VIs–1

This unit consists of soils of the Montevallo and Mountainburg series. These are shallow, well-drained and somewhat excessively drained, stony, upland soils that formed in residuum derived from acid sandstone and shale. The slope range is 1 to 12 percent. The surface layer is gravelly or stony fine sandy loam or silt loam. The subsoil is shaly silt loam to silty clay or stony fine sandy loam. Sandstone or shale bedrock is at a depth of 10 to 20 inches. These soils make up about 7 percent of the county.

Natural fertility is low, and the response to lime and fertilizer is poor. The reaction is strongly acid to very strongly acid. Permeability is moderate to rapid, and the available water capacity is low. The root zone is 10 to 20 inches thick.

These soils are not suitable for clean-tilled crops. The most suitable pasture plants are bermudagrass, weeping lovegrass, bahiagrass, crimson clover, vetch, and sericea lespedeza.

Droughtiness is the chief limitation. Runoff is moderate, and the erosion hazard is moderate. These soils can be used as pasture, rangeland, woodland, and wildlife habitat.

Capability unit VIs–2

The one soil in this unit, Wing silt loam, is a moderately well drained to somewhat poorly drained, very strongly alkaline soil on uplands, flats, and foot slopes. The slope range is 1 to 3 percent. The surface layer is friable silt loam. The subsoil is strongly alkaline, firm silty clay loam or silty clay. This soil makes up about 0.04 percent of the county.

Natural fertility is low, and the response to lime and fertilizer is moderate to poor. The reaction is very strongly alkaline, permeability is very slow, and the available water capacity is low. The root zone is seriously restricted by the alkaline subsoil.

This soil is not suitable for clean-tilled crops and is of limited suitability for grasses and legumes. The most suitable pasture plants are annual lespedeza and common bermudagrass.

Runoff is rapid, and the erosion hazard is severe. The subsoil is high in exchangeable sodium, and this limits the kinds of plants that can be grown.

Capability unit VIIe–1

This unit consists of soils of the Allen and Holston series. These are deep, well-drained soils on foot slopes and benches, mainly in the mountainous northern part of the county (fig. 16). The slope range is 12 to 65 percent. The surface layer is stony or gravelly loam, silt loam, or fine sandy loam. The subsoil is stony or gravelly silt loam, clay loam, loam, or sandy clay loam. These soils make up about 10.7 percent of the county.

Natural fertility is low. The reaction is medium acid to very strongly acid. Permeability is moderate, and the available water capacity is moderate. The root zone is 48 inches or more thick.

These soils are not suitable for clean-tilled crops. The most suitable pasture plants are bermudagrass, bahiagrass, weeping lovegrass, and sericea lespedeza.

Runoff is rapid, and the erosion hazard is very severe. These soils can be used as pasture, woodland, and wildlife habitat.

Capability unit VIIs–1

This unit consists of soils of the Enders series. These are deep, well-drained, upland soils. The slope range is 8 to 60 percent. The surface layer is stony or gravelly silt loam or fine sandy loam. The subsoil is plastic clay. Shale bedrock is at a depth of 40 to 65 inches. These soils make up about 7.1 percent of the county.

Natural fertility is low. The reaction is strongly acid to very strongly acid. The available water capacity is moderate. Permeability is very slow. The root zone is 3 to 6 feet thick. The clay subsoil restricts movement of water and roots.

These soils are not suitable for clean-tilled crops. The most suitable pasture plants are bermudagrass, bahiagrass, weeping lovegrass, and sericea lespedeza.

Runoff is rapid, and the erosion hazard is very severe. These soils can be used as pasture, rangeland, woodland, or wildlife habitat.

Capability unit VIIs–2

This capability unit consists of soils of the Montevallo and Mountainburg series. These are shallow, well-drained and somewhat excessively drained, stony and gravelly soils on uplands. They occur chiefly on ridges and hillside benches. The slope range is 8 to 65 percent. The

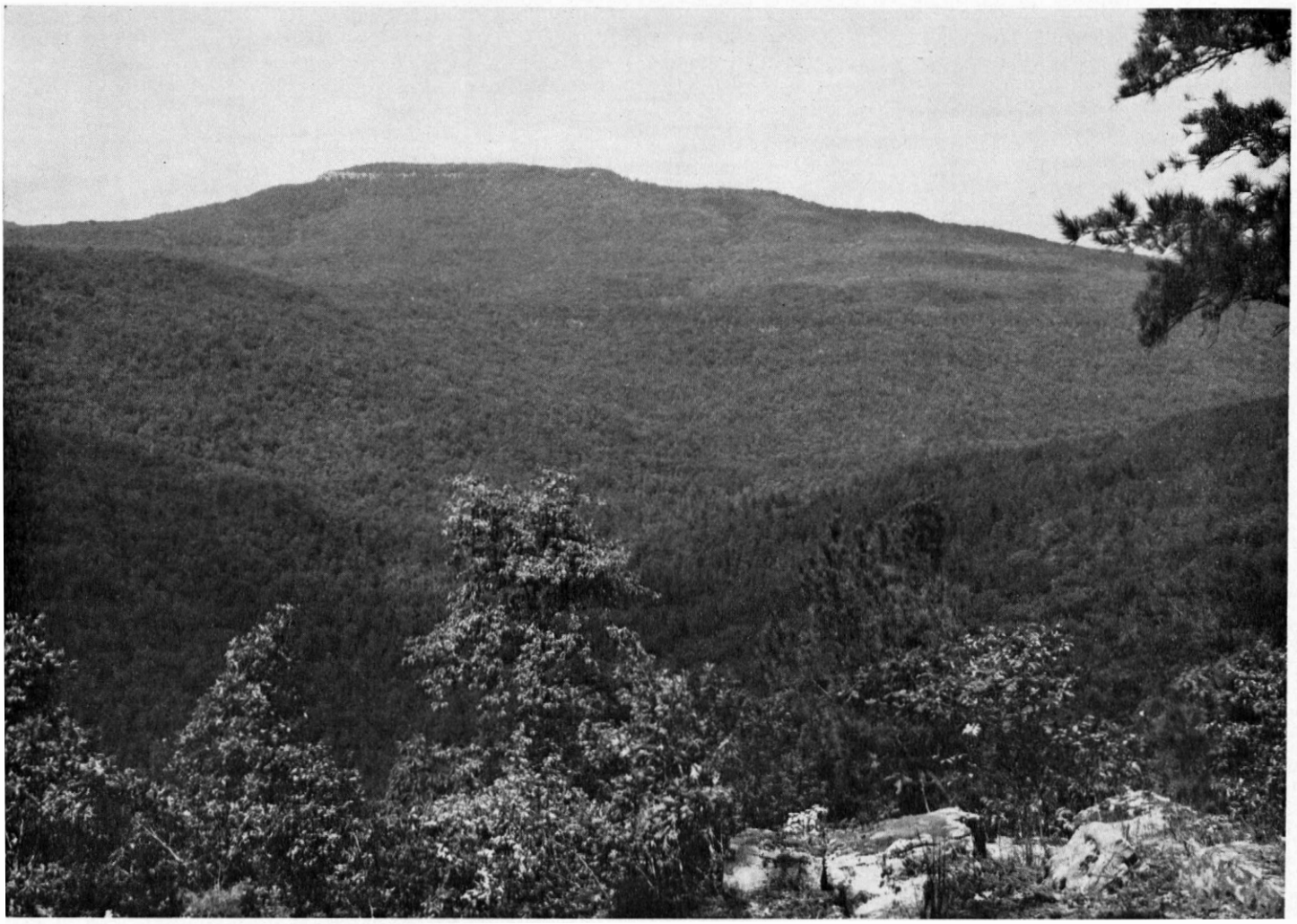

Figure 16.—**Steep, stony Allen and Holston soils on mountainsides.**

surface layer is stony or gravelly fine sandy loam or silt loam. The subsoil is gravelly or stony fine sandy loam or shaly silt loam to silty clay. Sandstone or shale bedrock is at a depth of 10 to 20 inches. These soils make up about 12.4 percent of the county.

Natural fertility is low. The reaction is strongly acid to very strongly acid. Permeability is moderate to rapid, and the available water capacity is low. The root zone is 10 to 20 inches thick.

These soils are not suitable for clean-tilled crops. The most suitable pasture plants are bermudagrass, bahiagrass, weeping lovegrass, and sericea lespedeza.

Droughtiness is the chief limitation. Runoff is rapid, and the erosion hazard is very severe. These soils can be used as pasture, rangeland, woodland, and wildlife habitat.

Capability unit VIIs–3

This unit consists of one land type, Rock land. Sandstone outcrops cover most of the surface. Between the outcrops are accumulations, a few inches thick, of gravelly and stony sandy loam. This land type makes up about 2.1 percent of the county.

Permeability is rapid, and the available water capacity is low.

Rock land is not suitable for clean-tilled crops, pasture plants, or trees. The vegetation is sparse. The woody vegetation consists of cedar, hawthorn, blackjack oak, and winged elm.

Droughtiness and shallowness are severe limitations. Rock land is used only as rangeland and wildlife habitat.

Capability unit VIIs–4

This unit consists of one land type, Cobbly alluvial land. This land type is nearly level and generally is adjacent to streams. The soil material is deep. It consists predominantly of cobblestones and gravel mixed with sandy loam or silt loam. There are a few lenses and pockets of sandy clay loam. This land type makes up about 0.1 percent of the county.

Natural fertility is low. The reaction is medium acid to very strongly acid. The available water capacity is low.

Cobbly alluvial land is not suitable for cultivated crops and is of limited suitability for pasture plants. The most suitable pasture plant is bermudagrass.

Droughtiness is a very severe limitation. The overflow hazard is very severe, and runoff is slow. This land type can be used only as rangeland, woodland, and wildlife habitat.

Predicted Yields

Predicted yields of the principal crops grown in Franklin County, under two levels of management, are shown in table 2. The predictions are based on information obtained from farmers and those who work with farmers. The figures represent averages that can be expected over a period of years.

The "A" columns in table 2 show the yields that can be expected under average management. Under such management, crops are not rotated according to a definite plan, the amounts and kinds of commercial fertilizer needed are not determined by soil tests, and little is done to control erosion or to provide adequate drainage.

The "B" columns show the yields that can be expected under improved management. Improved management includes such practices as (1) returning crop residue to the soil; (2) applying fertilizer in amounts determined by soil tests and on the basis of past experience; (3) choosing well-suited, high-yielding varieties for planting; (4) preparing a good seedbed; (5) planting or seeding at recommended rates and at the proper time; (6) inoculating legumes when necessary; (7) using shallow cultivation; (8) controlling weeds, insects, and diseases; (9) providing adequate surface drainage in level areas; (10) terracing and cultivating on the contour in sloping areas; and (11) controlling grazing.

TABLE 2.—*Predicted average yields per acre of principal crops*

[Figures in columns A indicate yields under average management; figures in columns B indicate yields under improved management. Absence of figure indicates the crop is not suited to or is not commonly grown on the soil specified, or the soil is not arable]

Soil	Corn (on ear)		Cotton (lint)		Grapes		Peaches		Soybeans		Wheat		Pasture			
													Common bermudagrass		Fescue	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lbs.*	*Lbs.*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*A.U.M.*[1]	*A.U.M.*[1]	*A.U.M.*[1]	*A.U.M.*[1]
Allen gravelly fine sandy loam, 3 to 8 percent slopes	22	45	275	500					12	18	16	30	4	6		
Allen gravelly fine sandy loam, 8 to 12 percent slopes											13	25	4	6		
Allen stony fine sandy loam, 8 to 12 percent slopes													3	5		
Allen stony fine sandy loam, 12 to 45 percent slopes													3	4		
Allen soils, gently rolling	30	55	300	525					14	30	16	30	5	7		
Allen soils, rolling													3	5		
Allen soils, steep													2	4		
Allen-Enders association, rolling:																
Allen soils													3	5		
Enders soils													2	4		
Allen-Enders association, steep:																
Allen soils													3	5		
Enders soils													2	4		
Allen-Enders association, very steep:																
Allen soils																
Enders soils																
Allen-Mountainburg association, rolling:																
Allen soils													3	5		
Linker soils													3	5		
Mountainburg soils													2	4		
Allen-Mountainburg association, steep:																
Allen soils													3	5		
Mountainburg soils													2	4		
Allen-Holston association, very steep:																
Allen soils																
Holston soils																
Mountainburg soils																
Bruno loamy fine sand													2	3		
Bruno and Iuka soils													4	6		
Caspiana silt loam	40	70	400	625					18	30	20	35	6	8	6	8
Cleora fine sandy loam, 0 to 1 percent slopes	40	65	375	575					16	28	16	26	6	8	6	8
Cleora fine sandy loam, 1 to 3 percent slopes	35	60	365	550					15	27	15	25	6	8	6	8
Cobbly alluvial land																
Dubbs fine sandy loam, 0 to 1 percent slopes	30	60	325	550	4	6			14	20	16	30	5	8		

See footnote at end of table.

TABLE 2.—*Predicted average yields per acre of principal crops*—Continued

Soil	Corn (on ear)		Cotton (lint)		Grapes		Peaches		Soybeans		Wheat		Pasture			
													Common bermudagrass		Fescue	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lbs.*	*Lbs.*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*A.U.M.*[1]	*A.U.M.*[1]	*A.U.M.*[1]	*A.U.M.*
Dubbs fine sandy loam, 1 to 3 percent slopes	25	55	300	500	4	6	----	----	14	20	16	30	5	7	----	----
Dubbs and Cleora soils:																
Dubbs soils	25	55	300	500	4	6	----	----	14	20	16	30	5	8	5	8
Cleora soils	35	60	365	550	----	----	----	----	15	27	15	25	5	8	5	8
Pickwick soils	24	50	290	490	4	6	105	200	12	18	15	28	5	7	4	6
Enders gravelly silt loam, 5 to 8 percent slopes, eroded	----	----	----	----	----	----	----	----	----	----	----	----	3	5	3	5
Enders gravelly silt loam, 8 to 20 percent slopes, eroded	----	----	----	----	----	----	----	----	----	----	----	----	3	5	5	5
Enders stony fine sandy loam, 12 to 50 percent slopes	----	----	----	----	----	----	----	----	----	----	----	----	2	4	----	----
Enders-Mountainburg association, rolling:																
Enders soils	----	----	----	----	----	----	----	----	----	----	----	----	3	5	----	----
Mountainburg soils	----	----	----	----	----	----	----	----	----	----	----	----	2	4	----	----
Enders-Mountainburg association, steep:																
Enders soils	----	----	----	----	----	----	----	----	----	----	----	----	3	5	----	----
Mountainburg soils	----	----	----	----	----	----	----	----	----	----	----	----	2	4	----	----
Falkner complex, mounded	----	----	----	----	----	----	----	----	----	----	----	----	3	5	3	5
Falkner silt loam, 0 to 1 percent slopes	20	50	360	490	----	----	----	----	15	25	12	20	5	7	4	6
Falkner silt loam, 1 to 3 percent slopes	20	45	350	475	----	----	----	----	15	25	12	20	5	7	4	6
Guthrie silt loam	----	----	----	----	----	----	----	----	----	----	----	----	3	5	3	5
Guthrie silt loam, flooded	----	----	250	400	----	----	----	----	14	22	----	----	4	6	5	8
Hartsells fine sandy loam, 1 to 3 percent slopes	28	50	290	490	3	5	110	210	14	20	16	30	5	7	----	----
Hartsells fine sandy loam, 3 to 8 percent slopes	24	45	275	460	3	5	105	200	12	18	14	26	5	7	----	----
Holston soils, rolling	----	----	----	----	----	----	----	----	----	----	----	----	5	7	----	----
Holston soils, steep	----	----	----	----	4	6	----	----	----	----	----	----	4	6	----	----
Holston-Enders association, rolling:																
Holston soils	----	----	----	----	----	----	----	----	----	----	----	----	4	6	----	----
Enders soils	----	----	----	----	----	----	----	----	----	----	----	----	2	4	----	----
Holston-Enders association, steep:																
Holston soils	----	----	----	----	----	----	----	----	----	----	----	----	3	5	----	----
Enders soils	----	----	----	----	----	----	----	----	----	----	----	----	2	4	----	----
Holston-Enders association, very steep:																
Holston soils	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Enders soils	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Iberia clay	----	----	290	475	----	----	----	----	16	25	16	30	5	7	6	8
Leadvale complex, mounded	----	----	----	----	----	----	----	----	12	18	12	23	4	6	4	6
Leadvale silt loam, 1 to 3 percent slopes	30	50	300	450	4	6	----	----	15	20	14	25	5	7	5	7
Leadvale silt loam, 3 to 8 percent slopes, eroded	25	45	250	400	----	----	----	----	15	20	14	26	5	7	----	----
Leadvale loam, 8 to 12 percent slopes, eroded	----	----	----	----	----	----	----	----	----	----	12	20	4	6	----	----
Linker fine sandy loam, 1 to 3 percent slopes	28	50	290	490	3	5	110	210	14	20	16	30	5	7	----	----
Linker fine sandy loam, 3 to 8 percent slopes	22	42	280	450	3	5	95	180	12	19	14	26	4	6	----	----
Linker fine sandy loam, 8 to 12 percent slopes	----	----	----	----	----	----	90	170	----	----	12	24	3	5	----	----
Linker soils, gently rolling	----	----	----	----	----	----	----	----	----	----	----	----	5	7	----	----
Linker-Mountainburg association, gently rolling:																
Linker soils	----	----	----	----	----	----	----	----	----	----	----	----	5	7	----	----
Mountainburg soils	----	----	----	----	----	----	----	----	----	----	----	----	3	5	----	----
McKamie silt loam, 3 to 8 percent slopes	----	----	----	----	----	----	----	----	----	----	12	22	3	5	----	----
Montevallo gravelly silt loam, 3 to 8 percent slopes	----	----	----	----	----	----	----	----	----	----	----	----	2	3	----	----
Montevallo-Mountainburg complex, 1 to 12 percent slopes:																
Montevallo soils	----	----	----	----	----	----	----	----	----	----	----	----	2	3	----	----
Mountainburg soils	----	----	----	----	----	----	----	----	----	----	----	----	3	4	----	----
Montevallo-Mountainburg complex, 12 to 40 percent slopes:																
Montevallo soils	----	----	----	----	----	----	----	----	----	----	----	----	1	2	----	----
Mountainburg soils	----	----	----	----	----	----	----	----	----	----	----	----	2	3	----	----

TABLE 2.—*Predicted average yields per acre of principal crops*—Continued

Soil	Corn (on ear)		Cotton (lint)		Grapes		Peaches		Soybeans		Wheat		Pasture			
													Common bermudagrass		Fescue	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
	Bu.	*Bu.*	*Lbs.*	*Lbs.*	*Tons*	*Tons*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*Bu.*	*A.U.M.*[1]	*A.U.M.*[1]	*A.U.M.*[1]	*A.U.M*
Moreland silty clay loam			350	475					15	28	15	25	5	7	5	
Morganfield very fine sandy loam	45	75	450	675					20	33			6	8	6	
Mountainburg gravelly fine sandy loam, 1 to 3 percent slopes			175	300			85	160			12	23	3	5		
Mountainburg gravelly fine sandy loam, 3 to 8 percent slopes							75	140			8	15	2	4		
Mountainburg gravelly fine sandy loam, 8 to 12 percent slopes													2	4		
Mountainburg stony fine sandy loam, 1 to 12 percent slopes													2	4		
Mountainburg stony fine sandy loam, 12 to 40 percent slopes													2	3		
Mountainburg-Rock land association, steep:																
Mountainburg soils													2	4		
Rock land																
Muldrow silt loam	25	40	300	500					17	26	16	30	5	7	6	8
Muskogee silt loam, 1 to 3 percent slopes	25	45	350	475					15	25	12	20	5	7		
Muskogee silt loam, 3 to 8 percent slopes	22	40	340	460					12	22	12	20	5	7		
Ora fine sandy loam, 3 to 8 percent slopes, eroded	25	40	250	400	4	6	100	180	15	20	14	26	5	7		
Pickwick silt loam, 1 to 3 percent slopes, eroded	30	55	300	500	4	6	110	210	14	20	16	30	5	7	4	6
Pickwick silt loam, 3 to 8 percent slopes, eroded	24	50	290	490	4	6	105	200	12	18	15	28	5	7	4	6
Rock land																
Taft complex, mounded													4	6	4	6
Taft silt loam, 0 to 1 percent slopes											15	25	4	7	4	7
Taft silt loam, 1 to 3 percent slopes											15	25	4	7	4	7
Wing silt loam													2	3		

[1] Animal-unit-months. The figures represent the number of months that 1 acre will provide grazing for 1 animal (1,000 pounds live weight), or the number of months the pasture can be grazed multiplied by the number of animal units an acre will support. For example, 1 acre of Caspiana silt loam in an improved pasture of fescue will provide grazing for 4 animals for 2 months, so it has a rating of 8 animal-unit-months.

Use of the Soils in Engineering[3]

Some soil properties are of special interest to engineers because they affect the construction and maintenance of roads, airports, pipelines, building foundations, facilities for water storage, erosion control structures, drainage systems, and sewage disposal systems. The properties most important to engineers are permeability, shear strength, density, shrink-swell characteristics, water-holding capacity, grain-size distribution, plasticity, and reaction. The depth to the water table, depth to bedrock, and topography also are important.

Information in this publication can be used to—

1. Make preliminary estimates of the engineering properties of soils in planning agricultural drainage systems, farm ponds, irrigation systems, diversion terraces, and other structures for conservation of soil and water.
2. Make studies that will aid in selecting locations for highways, airports, pipelines, and underground cables, and in planning detailed investigations at the selected locations.
3. Locate probable sources of sand and gravel and other construction material.
4. Make studies that will aid in selecting and developing industrial, commercial, residential, and recreational sites.

With the soil map for identification of soil areas, the data and interpretations in tables 3, 4, and 5 can be useful for many purposes. It should be emphasized, however, that these interpretations will not eliminate the need for sampling and testing at the site of specific engineering works involving heavy loads and excavations deeper than the depth of layers here reported. In part this is necessary because the mapping units identified by map symbols made up entirely of capital letters are of more varied composition than the others. The composition of these units, nevertheless, was controlled well enough that interpretations for expected uses can be made.

Some of the terms used by soil scientists have a special meaning in soil science that may not be familiar to engineers. These terms are defined in the Glossary.

[3] CHARLES E. CHILDRESS, agricultural engineer, Soil Conservation Service, helped prepare this section.

TABLE 3.—*Engineering*

[Tests performed by the Arkansas State Highway Department in cooperation with United States Department of Commerce, Bureau

Soil name and location	Parent material	Report number	Depth	Moisture-density [1]	
				Maximum dry density	Optimum moisture
			In.	*Lb./cu. ft.*	*Pct.*
Cleora fine sandy loam, 1 to 3 percent slopes:					
SE¼NW¼ sec. 25, T. 12 N., R. 27 W. (Modal).	Recent alluvium.	S–64–Ark–24–12–4 (SCS)	17–30	118	13
		S–64–Ark–24–12–6 (SCS)	46–72	123	12
Cleora fine sandy loam, 0 to 1 percent slopes:					
NE¼SE¼ sec. 29, T. 12 N., R. 26 W. (Nonmodal; grading toward Dubbs).	Recent alluvium.	S–64–Ark–24–7–1 (SCS)	0–7	109	16
		S–64–Ark–24–7–3 (SCS)	16–45	113	15
Dubbs fine sandy loam, 1 to 3 percent slopes:					
NE¼SE¼ sec. 29, T. 12 N., R. 26 W. (Modal).	Alluvium from Boston Mountains.	S–64–Ark–24–8–3 (SCS)	7–27	110	18
Enders gravelly silt loam, 3 to 8 percent slopes, eroded:					
12 miles N. on Ark. Highway 23 and 11.3 miles E. of Ozark on Barnes Road. (Modal).	Colluvial sandstone over noncalcareous shale.	S36963 (BPR)	2–5	109	15
		S36964 (BPR)	8–22	92	24
		S36965 (BPR)	39–46	87	25
		S36966 (BPR)	46–62	90	26
Enders gravelly silt loam, 8 to 20 percent slopes, eroded, in an area of Allen-Enders association, rolling:					
SE¼SE¼ sec. 3, T. 11 N., R. 26 W. (Nonmodal; less clay in upper part of B horizon).	Shale in Boston Mountains.	S–64–Ark–24–4–4 (SCS)	16–24	92	29
		S–64–Ark–24–4–4–7 (SCS)	36–72	91	28
Falkner silt loam, 1 to 3 percent slopes:					
NE¼NE¼ sec. 13, T. 8 N., R. 28 W. (Modal).	Shale and possibly loess.	S–64–Ark–24–6–1 (SCS)	0–7	103	19
		S–64–Ark–24–6–4 (SCS)	19–32	100	22
		S–64–Ark–24–6–5 (SCS)	32–68	99	23
SW¼SW¼ sec. 15, T. 8 N., R. 27 W. (Nonmodal; fragipan below claypan).	Shale and possibly loess.	S–64–Ark–24–5–2 (SCS)	2–8	104	18
		S–64–Ark–24–5–5 (SCS)	20–26	105	19
		S–64–Ark–24–5–6 (SCS)	26–72	106	20
Holston gravelly loam (Holston soils, steep):					
SW¼NE¼ sec. 23, T. 12 N., R. 27 W. (Nonmodal, shallow over clay).	Colluvium from the Boston Mountains.	S–64–Ark–24–11–3 (SCS)	4–8	107	18
		S–64–Ark–24–11–4 (SCS)	8–25	110	18
		S–64–Ark–24–11–6 (SCS)	31–37	109	19
Linker fine sandy loam, 3 to 8 percent slopes:					
SE¼NE¼ sec. 7, T. 11 N., R. 26 W. (Modal).	Sandstone in Boston Mountains.	S–64–Ark–24–2–1 (SCS)	0–5	114	12
		S–64–Ark–24–2–4 (SCS)	14–23	108	18
NE¼SE¼ sec. 18, T. 11 N., R. 26 W. (Nonmodal; deeper).	Sandstone in Boston Mountains.	S–64–Ark–24–1–1 (SCS)	0–7	110	16
		S–64–Ark–24–1–3 (SCS)	14–28	112	17
		S–64–Ark–24–1–4 (SCS)	28–35	116	16
Ora fine sandy loam, 3 to 8 percent slopes, eroded:					
NE¼SE¼NW¼ sec. 29, T. 12 N., R. 26 W. (Modal).	Old alluvium on high benches.	S–64–Ark–24–10–3 (SCS)	5–10	114	14
		S–64–Ark–24–10–5 (SCS)	13–23	113	15
		S–64–Ark–24–10–6 (SCS)	23–39	116	14

[1] Based on AASHO Designation: T 99–57, Methods A and C.

[2] Mechanical analysis according to AASHO Designation: T 88–57. Results by this procedure may differ somewhat from results obtained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method and the material coarser than 2 millimeters in diameter is excluded from calculations of grain-size fractions. The mechanical analysis data used in this table are not suitable for naming textural classes for soils.

test data

of Public Roads, in accordance with standard procedures of the American Association of State Highway Officials (AASHO)]

Mechanical analysis [2]							Liquid limit	Plasticity index	Classification	
Estimated percentage larger than 3 in. discarded in field sampling [3]	Percentage passing sieve—								AASHO	Unified [4]
	2-in.	¾-in.	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 40 (0.42 mm.)	No. 200 (0.074 mm.)				
							Pct.			
				100	99	36	[5] NP	NP	A–4(0)	SM
	100	91	84	81	75	23	NP	NP	A–2–4(0)	SM
					100	50	NP	NP	A–4(3)	SM
					100	56	25	5	A–4(4)	ML–CL
					100	79	29	10	A–4(8)	CL
	100	89	86	85	79	54	27	8	A–4(4)	CL
				100	96	86	66	32	A–7–5(20)	MH–CH
				100	98	97	78	41	A–7–5(20)	MH–CH
				100	95	92	75	40	A–7–5(20)	MH–CH
		100	99	94	88	83	69	35	A–7–5(20)	MH–CH
				100	98	97	73	37	A–7–5(20)	MH–CH
		100	99	96	93	83	32	9	A–4(8)	ML–CL
			100	99	97	92	42	18	A–7–6(12)	CL
			100	99	97	91	50	23	A–7–6(15)	CH
				100	98	86	29	7	A–4(8)	ML–CL
			100	98	96	86	33	12	A–6(9)	CL
			100	99	98	86	35	13	A–6(9)	CL
		100	84	70	61	54	34	8	A–4(4)	ML
		100	83	65	57	53	39	17	A–6(6)	CL
1			100	93	78	70	42	15	A–7–6(9)	ML–CL
				100	99	41	NP	NP	A–4(1)	SM
			100	99	98	65	36	10	A–4(6)	ML
			100	98	94	66	26	5	A–4(6)	ML–CL
		100	99	97	94	69	33	15	A–6(9)	CL
2		100	92	85	81	59	34	11	A–6(5)	ML–CL
	100	94	90	88	84	53	24	6	A–4(4)	ML–CL
		100	95	93	90	65	32	11	A–6(6)	CL
	100	99	94	91	88	61	30	10	A–4(5)	CL

[3] Based on sample as received in laboratory. Data not corrected for amount discarded in field sampling.

[4] SCS and BPR have agreed to consider that all soils having plasticity indexes within 2 points of the A-line are to be given a borderline classification. Examples of borderline classification obtained by this use are ML–CL and MH–CH.

[5] NP = Nonplastic.

TABLE 4.—*Estimated*

Soil series and map symbols [1]	Depth to bedrock	Depth to seasonal high water table	Depth from surface	Classification: USDA texture
Allen:	*Ft.*	*Ft.*	*In.*	
AgC, AgD.	5–15	>6	0–13	Gravelly fine sandy loam, gravelly loam
			13–72	Gravelly sandy clay loam
AsD, AsE, ADB, ADD, ADE, AED, AEE, AEF, AMD, AME, AMF. For Enders part of AED, AEE, and AEF, see Enders series. For Mountainburg part of AMD, AME, and AMF, see Mountainburg series. For Holston part of AMF, see Holston series. For Linker part of AMD, see Linker series.	5–15	>6	0–8	Stony fine sandy loam
			8–72	Stony sandy clay loam to stony loam
Bruno: Br, Bu. For Iuka part of Bu, see Iuka series.	4–20+	>4	0–65	Loamy fine sand, fine sand, loamy very fine sand.
			65–75	Fine sandy loam
Caspiana: Ca.	20+	>5	0–7	Silt loam
			7–52	Clay loam or silty clay loam
			52–72	Loam
Cleora:				
CrA.	4–10+	2–3	0–7	Fine sandy loam
			7–16	Sandy loam
			16–45	Loam
			45–84	Sandy loam
CrB.	4–10+	3–6	0–30	Fine sandy loam
			30–46	Fine sandy loam
			46–72	Gravelly sandy loam
Cobbly alluvial land: Cy.	3–6+	1–4	0–72	Very gravelly sandy loam
Dubbs: DbA, DbB, DC. For Cleora part of DC, see Cleora series. For Pickwick part of DC, see Pickwick series.	6–10+	3–6	0–7	Fine sandy loam to loam
			7–37	Loam to clay loam
			37–44	Fine sandy loam to loam
			44–72	Gravel and sand
Enders: EnC2, EnD2, EsF, EMD, EME. For Mountainburg part of EMD and EME, see Mountainburg series. For Montevallo part of EMD and EME, see Montevallo series.	4–8	2–4	0–5	Gravelly fine sandy loam
			5–62	Silty clay, clay
			62	Shale bedrock.
Falkner: Fc, FlA, FlB.	5–8+	1–2	0–7	Silt loam
			7–19	Silty clay loam
			19–32	Silty clay
			32–68	Clay
			68	Shale.
Guthrie: Gt, Gu.	5–8+	0–1	0–11	Silt loam, loam
			11–52	Silt loam to silty clay loam (fragipan below 17 inches).
			52–72	Silty clay
Hartsells: HaB, HaC.	2–4	----------	0–5	Fine sandy loam
			5–26	Loam to clay loam
			26	Sandstone bedrock.
Holston: HlD, HlE, HOD, HOE, HOF. For Enders part of HOD, HOE, and HOF, see Enders series.	5–15	>6	0–8	Gravelly loam
			8–17	Gravelly loam, gravelly clay loam
			17–39	Stony clay loam
			39–75	Stony clay loam
Iberia: Ib.	>20	0–1	0–72	Clay
Iuka.	4–8+	1–2	0–6	Fine sandy loam
			6–48	Fine sandy loam to loam
			48–62	Gravelly loamy sand
			62	Massive sandstone.

See footnote at end of table.

engineering properties

Classification—Continued		Percentage passing sieve—			Permeability	Available water capacity	Reaction	Shrink-swell potential
Unified	AASHO	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)				
					In./hr.	*In./in. of soil*	*pH*	
CL or ML	A–4	80–85	80–85	60–70	2. 0 –6. 3	0. 17	6. 0–6. 5	Low.
CL	A–6	80–85	80–85	65–70	0. 63–2. 0	. 17	5. 0–5. 5	Low.
CL or ML	A–4	80–85	80–85	65–70	2. 0 –6. 3	. 14	6. 0–6. 5	Low.
CL	A–6	80–85	80–85	65–70	0. 63–2. 0	. 17	5. 0–5. 5	Low.
SM	A–2	100	100	15–35	>6. 3	. 08	6. 5–7. 0	Low.
SM	A–2 or A–4	100	100	25–40	0. 63–2. 0	. 22	6. 0–6. 5	Low.
ML	A–4	90–100	90–100	60–70	0. 63–2. 0	. 22	6. 0–6. 5	Low.
CL	A–4	90–100	90–100	70–80	0. 63–2. 0	. 17	5. 5–6. 0	Low.
CL or ML	A–4	90–100	90–100	55–65	0. 63–2. 0	. 17	5. 5–6. 0	Low.
SM	A–4	100	100	40–50	2. 0–6. 3	. 14	5. 5–6. 0	Low.
SM	A–4, A–2	90–100	90–100	30–40	2. 0–6. 3	. 14	6. 0–6. 5	Low.
ML–CL	A–4	100	100	50–60	0. 63–2. 0	. 17	6. 0–6. 5	Low.
SM	A–2, A–4	90–100	90–100	30–40	>6. 3	. 08	6. 0–6. 5	Low.
SM	A–4, A–2	90–100	90–100	30–40	2. 0–6. 3	. 14	5. 0–5. 5	Low.
SM or ML	A–4	80–90	80–90	45–55	2. 0–6. 3	. 14	5. 0–5. 5	Low.
SM	A–2	80–90	80–90	20–30	2. 0–6. 3	. 14	5. 0–5. 5	Low.
GM	A–1	35–45	30–40	15–25	>6. 3	. 08	5. 0–5. 5	Low.
CL or ML	A–4	100	100	60–70	0. 63–2. 0	. 17	6. 0–6. 5	Low.
CL	A–4	100	100	70–80	0. 63–2. 0	. 17	6. 0–6. 5	Low.
SM or ML	A–4	100	100	45–55	0. 63–2. 0	. 17	6. 0–6. 5	Low.
								Low.
SM or CL	A–4	85–100	85–95	45–55	0. 2–0. 63	. 21	4. 5–5. 0	Low.
CL or MH–CH	A–7	90–100	90–100	65–100	<0. 2	. 19	4. 5–5. 0	High.
ML–CL	A–4	95–100	95–100	80–90	0. 63–2. 0	. 22	5. 0–5. 5	Low.
CL	A–6	95–100	95–100	85–95	0. 2–0. 63	. 21	5. 0–5. 5	Moderate.
CL	A–6 or A–7	95–100	95–100	85–95	<0. 2	. 19	5. 0–5. 5	High.
CL or CH	A–6 or A–7	95–100	95–100	85–95	<0. 2	. 19	4. 5–5. 0	High.
CL or ML	A–4	100	100	80–90	0. 2–0. 63	. 22	5. 0–6. 0	Low.
CL	A–6	100	100	90–100	<0. 2	. 21	4. 5–5. 0	Moderate.
CH	A–7	100	100	85–95	<0. 2	. 19	4. 5–4. 0	High.
SM	A–4	100	100	40–50	2. 0–6. 3	. 14	5. 0–5. 5	Low.
CL	A–6	100	100	60–70	0. 63–2. 0	. 17	4. 5–5. 0	Low.
ML	A–4	80–85	65–75	50–60	0. 63–2. 0	. 17	5. 5–6. 0	Low.
CL	A–6	80–85	60–70	50–60	0. 63–2. 0	. 17	5. 5–6. 0	Low.
ML or CL	A–6	90–100	90–100	65–75	0. 63–2. 0	. 17	5. 0–5. 5	Moderate.
CL	A–6	80–85	80–85	65–70	0. 63–2. 0	. 17	4. 5–5. 0	Moderate.
MH or CH	A–7	100	100	95–100	<0. 2	. 19	6. 5–7. 0	High.
ML	A–4	100	100	80–90	0. 63–2. 0	. 14	6. 5–7. 0	Low.
ML	A–4	100	100	80–90	0. 63–2. 0	. 14	5. 0–5. 5	Low.
SM	A–2	55–85	50–80	15–25	>6. 3	. 05	4. 5–5. 0	Low.

TABLE 4.—*Estimated*

Soil series and map symbols [1]	Depth to bedrock	Depth to seasonal high water table	Depth from surface	Classification: USDA texture
	Ft.	*Ft.*	*In.*	
Leadvale: Lc, LeB, LeC2, LID2.	6–8+	1–2	0–8	Silt loam
			8–22	Silt loam to silty clay loam
			22–72	Silty clay loam (fragipan)
Linker: LnB, LnC, LnD, LKB, LMB. For Mountainburg part of LMB, see Mountainburg series.	2	----------	0–8	Fine sandy loam
			8–23	Sandy clay loam
			23–31	Clay loam to gravelly sandy clay loam
			31	Sandstone bedrock.
McKamie: MkC.	20+	4–6+	0–5	Silt loam
			5–9	Silty clay
			9–40	Clay
			40–72	Silty clay loam
Montevallo: MIC, MmD, MmE. For Mountainburg part of MmD and MmE, see Mountainburg series.	1–1. 5	----------	0–7	Gravelly silt loam
			7–11	Gravelly silty clay loam to silty clay
			11	Silty clay loam between layers of shale
Moreland: Mo.	20+	1–2	0–13	Silty clay loam
			13–72	Silty clay
Morganfield: Ms.	20+	6+	0–18	Very fine sandy loam
			18–35	Loam, very fine sandy loam
			35–72	Silt loam to fine sandy loam
Mountainburg: MtB, MtC, MtD, MuD, MuE, MRE. For Rock land part of MRE, see Rock land	1–1. 5	----------	0–18	Gravelly or stony fine sandy loam
			18	Sandstone bedrock.
Muldrow: Mw.	20+	0–1	0–17	Silt loam, silty clay loam
			17–41	Clay
			41–72	Silty clay
Muskogee: MzB, MzC.	20+	1–2	0–9	Silt loam
			9–26	Silt loam to silty clay loam
			26–72	Silty clay to clay
Ora: OrC2.	5–8+	2–3	0–10	Fine sandy loam or loam
			10–23	Clay loam
			23–39	Clay loam (fragipan)
			39–60	Gravelly sandy clay loam (fragipan)
			60	Sandstone bedrock.
Pickwick: PsB2, PsC2.	6+	>6	0–9	Silt loam, loam
			9–72	Clay loam, loam
Rock land: Ro.	----------	----------	0–72	Sandstone bedrock.
Taft: Tc, TfA, TfB.	4–8+	1–2	0–15	Silt loam
			15–58	Silt loam to silty clay loam (fragipan)
			58+	Shale.
Wing: Wg.	4–6+	0–1	0–8	Silt loam
			8–16	Silt loam
			16–72	Silty clay

[1] The mapping units identified by map symbols made up entirely of capital letters are of more varied composition than the others, but the composition of these units was controlled well enough that interpretations for expected uses can be made.

engineering properties—Continued

Classification—Continued		Percentage passing sieve—			Permeability	Available water capacity	Reaction	Shrink-swell potential
Unified	AASHO	No. 4 (4.7 mm.)	No. 10 (2.0 mm.)	No. 200 (0.074 mm.)				
					In./hr.	*In./in. of soil*	*pH*	
ML	A-4	100	100	75–85	0. 63–2. 0	. 22	6. 0–6. 5	Low.
CL	A-6	100	100	80–90	0. 2–0. 63	. 21	5. 5–6. 0	Moderate.
CL	A-6	100	100	85–95	0. 2–0. 63	. 21	5. 5–6. 0	Moderate.
SM or ML	A-4	100	95–100	40–70	2. 0–0. 63	. 14	5. 0–5. 5	Low.
ML or CL	A-4	95–100	95–100	60–70	0. 63–2. 0	. 17	5. 0–5. 5	Low.
ML or CL	A-4 or A-6	90–100	80–90	55–65	0. 63–2. 0	. 17	4. 5–5. 0	Low.
CL or ML	A-4	100	100	65–75	0. 2–0. 63	. 22	4. 5–5. 0	Low.
CH	A-7	100	100	85–95	<0. 2	. 19	4. 5–5. 0	High.
CH	A-7	100	100	90–100	<0. 2	. 19	4. 5–5. 0	High.
CL	A-6	100	100	80–90	0. 2–0. 63	. 19	7. 0–7. 5	Moderate.
CL	A-6 or A-4	90–100	90–100	80–90	0. 63–2. 0	. 19	5. 0–5. 5	Low.
ML or CL	A-6 or A-7	90–100	90–100	75–85	0. 2–2. 0	. 21	4. 5–5. 0	Moderate
ML or CL	A-6 or A-7	90–100	90–100	80–90	<0. 2	. 19	5. 0–5. 5	Moderate.
CL or CH	A-6 or A-7	90–100	90–100	90–100	0. 2–0. 63	. 21	6. 0–6. 5	High.
CH	A-7	90–100	90–100	90–100	<0. 2	. 21	6. 0–6. 5	High.
SM	A-4	100	95–100	40–50	0. 63–2. 0	. 22	5. 5–6. 5	Low.
ML	A-4	100	95–100	50–60	0. 63–2. 0	. 22	6. 5–7. 0	Low.
CL or ML	A-4	100	95–100	70–80	0. 63–2. 0	. 17	6. 5–7. 0	Low.
SM	A-4	80–90	80–90	40–50	>6. 3	. 08	4. 5–5. 0	Low.
CL	A-4	100	100	85–95	0. 2–0. 63	. 22	6. 0–6. 5	Low.
CH	A-7	100	100	90–95	<0. 2	. 19	5. 5–6. 0	High.
CL	A-6	100	100	85–90	0. 2–0. 63	. 21	6. 5–7. 0	High.
ML	A-4	100	100	85–95	0. 2–0. 63	. 22	5. 0–5. 5	Low.
CL	A-6	100	100	90–100	0. 2–0. 63	. 21	5. 0–5. 5	Moderate.
CH	A-7	100	100	90–100	<0. 2	. 19	5. 0–5. 5	High.
SM or ML-CL	A-4	85–95	85–90	45–75	0. 63–2. 0	. 14	5. 0–5. 5	Low.
CL	A-6	90–100	90–100	60–70	0. 2–0. 63	. 17	5. 0–5. 5	Low.
CL	A-4 or A-6	90–100	90–95	55–65	<0. 2	. 14	5. 0–5. 5	Low.
CL	A-4 or A-6	95–100	90–100	65–70	0. 63–2. 0	. 17	5. 0–5. 5	Low to moderate.
CL or ML	A-4	100	100	55–65	0. 63–2. 0	. 22	5. 5–6. 0	Low.
CL	A-6	100	100	60–80	0. 63–2. 0	. 17	5. 0–5. 5	Moderate.
CL or ML	A-4 or A-6	100	100	90–100	0. 2–0. 63	. 21	5. 0–5. 5	Moderate.
CL	A-6	100	100	90–100	0. 2–0. 63	. 21	5. 0–5. 5	Moderate.
CL or ML	A-4	100	100	85–95	0. 2–0. 63	. 22	6. 0–6. 5	Low.
CL or ML	A-4 or A-6	100	100	85–95	<0. 2	. 21	7. 5–8. 0	Moderate.
CH	A-7	100	100	85–95	<0. 2	. 19	8. 5–9. 5	Moderate to high.

TABLE 5.—*Engineering*

Soil series and map symbols [1]	Suitability as source of—			Suitability for winter grading
	Topsoil	Road subgrade and fill	Gravel	
Allen: AgC, AgD	Fair	Fair	Poor	Fair
AsD, AsE, ADB, ADD, ADE, AED, AEE, AEF, AMD, AME, AMF—For Enders part of AED, AEE, and AEF, see Enders series. For Mountainburg part of AMD, AME, and AMF, see Mountainburg series. For Holston part of AMF, see Holston series. For Linker part of AMD, see Linker series.	Poor	Fair	Poor	Fair
Bruno: Br	Poor	Good	Poor	Good
Bu—For Iuka part of Bu, see Iuka series.	Poor	Good	Poor	Good
Caspiana: Ca	Good	Poor	Poor	Fair
Cleora: CrA, CrB	Good	Fair to good	Poor	Fair
Cobbly alluvial land: Cy	Poor	Poor	Good	Good
Dubbs: DbA, DbB, DC—For Cleora part of DC, see Cleora series. For Pickwick part of DC, see Pickwick series.	Good	Fair to good	Poor	Fair
Enders: EnC2, EnD2, EsF, EMD, EME—For Mountainburg part of EMD and EME, see Mountainburg series. For Montevallo part of EMD and EME, see Montevallo series.	Poor	Poor	Poor	Poor
Falkner: Fc, FlA, FlB	Fair to poor	Poor	Poor	Poor
Guthrie: Gt, Gu	Poor	Poor	Poor	Poor
Hartsells: HaB, HaC	Fair	Fair	Poor	Fair
Holston: HLD, HLE, HOD, HOE, HOF—For Enders part of HOD, HOE, and HOF, see Enders series.	Poor	Fair	Poor	Fair
Iberia: Ib	Poor	Poor	Poor	Poor
Iuka	Fair	Fair to good	Poor	Fair to good
Leadvale: Lc	Fair to poor	Poor	Poor	Poor
LeB, LeC2, LlD2	Fair to poor	Poor	Poor	Poor
Linker: LnB, LnC, LnD, LKB, LMB—For Mountainburg part of LMB, see Mountainburg series.	Fair	Fair	Poor	Fair

See footnote at end of table.

interpretations

Soil features affecting—				
Farm ponds		Agricultural drainage	Irrigation	Terraces and diversions
Reservoir area	Embankment			
Moderate seepage rate	All features favorable	Not needed; good natural drainage.	Slope	Strong slope.
Steep slope; moderate seepage rate.	All features favorable	Not needed; good natural drainage.	Slope	Most slope too steep; stones.
High seepage rate; some flooding.	High seepage rate; piping	Not needed; excessive natural drainage.	Very low available water capacity.	Very short, low slope.
High seepage rate; flooding.	High seepage rate; piping; flooding.	Not needed; excessive natural drainage; flooding.	Very low available water capacity; flooding.	Very short, low slope; flooding.
High seepage rate	Piping	Not needed; good natural drainage.	Low available water capacity.	Erosion hazard.
High seepage rate	High seepage rate; piping	Not needed; good natural drainage.	Low available water capacity.	Not needed; no limiting features.
Frequent flooding; excessive seepage.	Frequent flooding; high seepage rate.	Frequent flooding; excessive natural drainage.	Very low available water capacity; frequent flooding.	Nearly level; frequent flooding; not suitable for cultivation.
High seepage rate	Piping	Not needed; good natural drainage.	No limiting features	Not needed; no limiting features.
All features favorable	Cracking and sloughing	Not needed; good natural drainage.	Very slow intake rate; steep slope.	Severe erosion hazard; steep slope.
All features favorable	All features favorable	Very slow permeability	Slow intake rate; mounds.	Mounds; slope.
All features favorable	All features favorable	Flooding; very slow permeability.	Slow intake rate; flooding; high water table.	Not needed; level surface.
Bedrock commonly at a depth of less than 40 inches.	All features favorable	Not needed; good natural drainage.	Slope	Erosion hazard; slope.
Moderate seepage rate; steep slope.	All features favorable	Not needed; good natural drainage.	Steep slope	Steep slope.
All features favorable	High shrink-swell potential.	Very slow permeability	Slow intake rate	Not needed; level surface.
High seepage rate	High seepage rate	Flooding	Flooding	Not needed; flooding.
All features favorable	All features favorable	Mounds; very slow permeability.	Slow intake rate; mounds.	Mounds.
All features favorable	All features favorable	Slow permeability	Slow intake rate	Slope.
Bedrock commonly at a depth of less than 40 inches.	All features favorable	Not needed; good natural drainage.	Slope	Erosion hazard; slope.

TABLE 5.—*Engineering*

Soil series and map symbols [1]	Suitability as source of—			Suitability for winter grading
	Topsoil	Road subgrade and fill	Gravel	
McKamie: MkC	Poor	Poor	Poor	Poor
Montevallo: MlC	Poor	Poor	Poor	Fair to poor
MmD, MmE For Mountainburg part of MmD and MmE, see Mountainburg series.	Poor	Poor	Poor	Fair to poor
Moreland: Mo	Poor	Poor	Poor	Poor
Morganfield: Ms	Good	Fair	Poor	Fair
Mountainburg: MtB, MtC, MtD	Poor	Poor	Poor	Good
MuD, MuE, MRE For Rock land part of MRE, see Rock land.	Poor	Poor	Poor	Good
Muldrow: Mw	Poor	Poor	Poor	Poor
Muskogee: MzB, MzC	Fair to poor	Poor	Poor	Fair to poor
Ora: OrC2	Fair	Fair	Poor	Poor
Pickwick: PsB2, PsC2	Fair	Poor	Poor	Poor
Rock land: Ro	Unsuitable	Unsuitable	Unsuitable	Unsuitable
Taft: Tc, TfA, TfB	Poor	Poor	Poor	Poor
Wing: Wg	Poor	Poor	Poor	Poor

[1] The mapping units identified by map symbols made up entirely of capital letters are of more varied composition than the others, but the composition of these units was controlled well enough that interpretations for expected uses can be made.

interpretations—Continued

Soil features affecting—				
Farm ponds.		Agricultural drainage	Irrigation	Terraces and diversions
Reservoir area	Embankment			
All features favorable	High shrink-swell potential; low stability.	Not needed; good natural drainage.	Slow intake rate	Severe erosion hazard; high shrink-swell potential.
All features favorable	Shallow over shale bedrock.	Not needed; good natural drainage.	Low available water capacity; very slow intake rate.	Very thin surface layer; soil low in productivity.
All features favorable	Shallow over shale bedrock.	Not needed; good natural drainage.	Low available water capacity; very slow intake rate; steep slope.	Very thin surface layer; soil low in productivity; steep slope.
All features favorable	High shrink-swell potential; low stability.	Very slow permeability	Slow intake rate	Not needed; level surface.
Moderate seepage rate	Piping; low stability; erosion hazard.	Not needed; good natural drainage.	No limiting features	Level to undulating; irregular slope.
Less than 20 inches thick over sandstone bedrock.	High seepage rate; piping.	Not needed; good natural drainage.	Low available water capacity; very shallow over bedrock.	Less than 20 inches thick over bedrock; erosion hazard.
Less than 20 inches thick over sandstone bedrock.	High seepage rate	Stony; good natural drainage.	Low available water capacity; very shallow over bedrock.	Stony; steep slope; less than 20 inches thick over bedrock.
All features favorable	High shrink-swell potential.	Very slow permeability	Slow intake rate	Not needed; level surface.
All features favorable	High shrink-swell potential.	Moderately good natural drainage; very slow permeability.	Slow intake rate	Erosion hazard.
All features favorable	All features favorable	Moderately good natural drainage; slope.	Slow intake rate	All features favorable.
All features favorable	All features favorable	Not needed; good natural drainage.	Slow intake rate; slope	All features favorable.
Sandstone bedrock	Sandstone bedrock	Sandstone bedrock	Sandstone bedrock	Sandstone bedrock.
All features favorable	All features favorable	Slow permeability; high water table; mounds.	Slow intake rate; mounds.	Not needed; level surface.
All features favorable	Unstable material; dispersed piping; high shrink-swell potential.	Very slow permeability; unproductive.	Very slow intake rate; low available water capacity; unproductive.	Unproductive.

Engineering Classification Systems

Engineers use two systems for classifying soils. The AASHO system (*1*) was developed by the American Association of State Highway Officials. The Unified system (*16*) is used by the Corps of Engineers, U.S. Army, and by other agencies.

In the AASHO system all soil material is classified in seven principal groups. The groups range from A–1, which consists of soils that have the highest bearing strength, to A–7, which consists of soils that have the lowest strength when wet. Within each group, the relative engineering value of the soil material is indicated by a group index number. The numbers range from 0 for the best material to 20 for the poorest. The group index number is shown in parentheses following the soil group symbol.

In the Unified system soils are identified according to particle-size distribution, plasticity, liquid limit, and organic-matter content. Soils are grouped into 15 classes. There are eight classes of coarse-grained soils, identified as GW, GP, GM, GC, SW, SP, SM, and SC; six classes of fine-grained soils, identified as ML, CL, OL, MH, CH, and OH; and one class of highly organic soils, identified as Pt.

Soil scientists use the USDA textural classification (*12*). In this, the texture of the soil is determined according to the proportion of soil particles smaller than 2 millimeters in diameter, that is, the proportion of sand, silt, and clay.

Table 3 shows the AASHO and Unified classification of specified soils in the county, as determined by laboratory tests. Table 4 shows the estimated classification of all the soils in the county according to all three systems of classification.

Engineering Test Data

Soil samples, representing 7 soil series, taken from 11 profiles in the county, were tested in accordance with standard procedures to help evaluate the soils for engineering purposes. The results of these tests are shown in table 3.

Moisture-density data are obtained by compacting soil material at successively higher moisture content. Assuming that the compactive effort remains constant, the density of the compacted material increases as the moisture content increases until the optimum moisture content is reached. After that, the density decreases with increase in moisture content. The highest dry density obtained in the compaction test is termed "maximum dry density." Moisture-density data are important in earthwork because, as a rule, optimum stability is obtained if the soil is compacted to about maximum dry density when it is at approximately the optimum moisture content.

Mechanical analysis determines the relative proportions of the different sizes of particles in the soil sample. The column headed "Mechanical analysis" shows the percentages, by weight, of soil particles that pass sieves of specified sizes. The clay fraction was determined by the hydrometer method.

The tests for the plastic limit and liquid limit of soil measure the effect of water on the strength and consistence of the soil material. As the moisture content of a clayey soil increases from a very dry state, the material changes from a semisolid to a plastic state; the moisture content at which this change occurs is the plastic limit. As the moisture content is further increased, the material changes from a plastic to a liquid state; the moisture content at which this change occurs is the liquid limit. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range in moisture content within which a soil is in a plastic condition.

Estimated Engineering Properties

Estimates of soil properties that are significant in engineering are listed in table 4. The estimates are based on data shown in table 3, on information obtained during the survey, and on experience with the soils of the county in engineering construction.

The column headed "Permeability" indicates the rate at which water moves downward through undisturbed and uncompacted soil material. The estimates are based on soil structure and porosity. Lateral seepage and mechanically developed features, such as plowpans and surface crusts, have not been considered.

The column headed "Available water capacity" gives estimates of the amount of capillary water in the soil and available to plants, after all free water has drained away.

Reaction, which refers to the degree of acidity or alkalinity of a soil, is expressed in pH values. The degrees of acidity or alkalinity are described under "Reaction" in the Glossary.

The column headed "Shrink-swell potential" indicates the volume change to be expected of the soil material with a change in moisture content, that is, the extent to which the soil shrinks when dry and swells when wet. This potential change is influenced by the amount and kind of clay in the soil.

Engineering Interpretations

Estimates of the suitability of soils for various engineering uses are given in table 5. Features or characteristics that are likely to affect various engineering practices were considered, and evaluations were based on data shown in table 3, on estimates of soil properties given in table 4, and on field performance. Following are explanations of the items in table 5.

Topsoil is needed to maintain vegetation for control of erosion on embankments, road shoulders, and cut slopes. The ratings in the column headed "Topsoil" indicate the suitability of the soils for such use.

The ratings in the column headed "Road subgrade and fill" indicate the performance that can be expected of soil material moved from borrow areas and used for such purposes. Among the features considered were stability (fig. 17), traffic-supporting capacity, shrink-swell potential, and depth to bedrock.

Figure 17.—**Slumping of unstable soil in highway road cut. The soil is Enders fine sandy loam.**

The ratings in the column headed "Gravel" are based on the probability that specified soils contain deposits of sand and gravel. The ratings do not indicate the quality or the size of the deposits.

Soils were rated for winter grading on the basis of drainage and on the workability of the soil material when it is wet.

Reservoir sites for farm ponds are affected mainly by seepage loss. Among the other features considered in the ratings were the slope, the depth to bedrock, and the hazard of flooding.

The features that affect the use of a soil in the construction of farm pond embankments are seepage, texture, strength and stability, permeability when compacted, and shrink-swell potential.

Agricultural drainage is essential on many of the soils on flood plains. It is also essential on soils that have poor drainage as a result of a slowly permeable layer. The Falkner, Guthrie, Iberia, Muldrow, and Taft soils are examples of soils that need drainage.

Generally only the most productive soils should be irrigated. Best results are obtained on well-drained soils that have moderate to moderately rapid infiltration and a moderate or high available water capacity. The Bruno, Cleora, Dubbs, Leadvale, and Morganfield soils, for example, are suitable for irrigation. Either a surface or a sprinkler system is a suitable means of irrigating the moderately to slowly permeable soils. A sprinkler system is the most suitable for the rapidly permeable soils.

Terraces and diversions are essential for effective control of erosion on many of the soils in the county, for example, the Allen, Hartsells, Leadvale, Linker, and Pickwick soils. Stones, shallowness, erodibility, and irregular and steep topography are among the unfavorable soil features.

Nonfarm Use of the Soils

Table 6 gives the degree and kind of limitation of the soils of Franklin County for selected nonfarm uses. The degree of limitation reflects all the features of a given soil, to a depth of 6 feet, that affect a particular use. *Slight* indicates that the limitation is not serious and is easily overcome; *moderate* indicates that the limitation generally can be corrected by practical means; *severe*, that the limitation is difficult to overcome; and *very severe*, that the use of the soil for a particular purpose generally is impractical.

The features considered significant in determining the limitation of the soils include percolation rate, erosion, water table, flood hazard, shrink-swell potential, bearing strength, traffic-supporting capacity, depth to rock, coarse fragments, slope, and trafficability.

Soils that are not otherwise limited are suitable for use as septic tank filter fields if the percolation rate is faster than 45 minutes per inch. Limitations are severe if the rate is between 45 and 75 minutes per inch and very severe if it is slower than 75 minutes per inch. Other limiting features are a seasonal high water table, flooding, shallowness over bedrock, and steep slopes. All of these factors are considered in the ratings given in table 6.

The water table is the upper surface of free water in the soil. In places it may be perched, that is, separated from a lower water table by a dry zone. Both the depth to the water table and the length of time the table remains at that depth are considered. For example, if the water table is below a depth of 30 inches for less than 6 months and is never above a depth of 15 inches, the limitation of the soil for building foundations is only slight. If the water table is above a depth of 48 inches, the limitation of the soil for use as septic tank fields is severe. If the water table is below a depth of 15 inches during periods of heavy use, the limitation for use of the soil as trafficways is moderate, but if it is above a depth of 15 inches during any part of this period, the limitation is severe.

Shrink-swell potential is the potential change in volume with change in moisture content, that is, the extent to which a soil shrinks when dry and swells when wet. This potential change is influenced by the amount and kind of clay in the soil. Damage to buildings is often caused by the shrinking and swelling of the soil after construction.

Bearing capacity is based on estimates of the maximum load that a soil can support when compacted. It is used to determine soil stability for building foundations.

Traffic-supporting capacity is the ability of an undisturbed soil to support moving loads. It indicates the suitability of the soil for use as subgrade.

Trafficability is determined by the ease with which people can move about on foot or in small vehicles. Loamy soils that have a water table below a depth of 30 inches during periods of heavy use and are not subject to flooding have only slight limitations. Clayey soils have severe limitations.

TABLE 6.—*Degree and kind of limitation for building*

Soil	Foundations of dwellings [1]	Septic tank filter fields
Allen:		
AgC, ADB	Slight	Slight
AgD	Slight	Slight
AsD, ADD, AED, AMD. For Enders part of AED, see Enders: EnD2. For Linker part of AMD, see Linker series. For Mountainburg part of AMD, see Mountainburg series.	Moderate: slope	Moderate: slope
AsE, ADE, AEE, AEF, AME, AMF. For Enders part of AEE and AEF, see Enders: EnD2. For Mountainburg part of AME and AMF, see Mountainburg series. For Holston part of AMF, see Holston series.	Severe: slope	Severe: slope
Bruno: Br, Bu. For Iuka part of Bu, see Iuka series.	Severe: flood hazard; occasional high water table; slight if not flooded.	Severe: flood hazard; occasional high water table; slight if not flooded.
Caspiana: Ca	Slight	Slight
Cleora: CrA, CrB	Severe: occasional high water table; flood hazard.	Severe: occasional high water table; flood hazard.
Cobbly alluvial land: Cy	Very severe: high water table; flood hazard.	Very severe: high water table; flood hazard.

See footnote at end of table.

For dwellings, the degree of limitation depends on permeability, percolation, stability, flood hazard, wetness, depth to water table, depth to bedrock, topography, and suitability for lawn grasses, shrubs, and trees. If the slope and depth to bedrock are not limiting factors and percolation is adequate for the disposal of septic tank effluent, the limitation is the same for dwellings served by sewage systems as for those that require septic tanks.

The degree of limitation for use as picnic sites, campsites, playgrounds, and parks depends on productivity, wetness, flood hazard, topography, accessibility, and suitability of the soils for impounding water.

For trafficways, the degree of limitation depends on potential for corrosion of metal conduits, erodibility, shrink-swell potential, topography, flood hazard, depth to water table, depth to bedrock, and permeability. Soils that have a high water table, are slowly permeable, or are subject to flooding may require intensive drainage or flood-control measures to make them suitable for heavy construction. A fragipan presents problems of drainage, and a high shrink-swell potential presents problems of stability that may be very difficult to resolve.

The information in this section is intended only as a guide in planning nonfarm uses of the soils and does not eliminate the need for onsite investigation before construction. As much as 15 percent of an area designated on the map as a specific soil may contain spots of other soils that have limitations that differ from those of the specified soil. The kinds and degrees of limitations vary widely within the county. The information in this section will help to locate desirable sites for buildings, residences, and recreation areas. It will also help to determine the feasibility of construction where the limitations are severe or very severe.

Use of the Soils for Woodland [4]

Virgin forests covered almost all of Franklin County. Bottom-land oak, sweetgum, cottonwood, sycamore, ash, and pecan were the principal species at the lower elevations and on the flood plains. Red oak, white oak, black oak, black walnut, black locust, and hickory were the principal species on the uplands. There were also scattered stands of shortleaf pine.

Woodland now covers about 57 percent of the county, or about 225,900 acres. Part of this acreage, 110,771 acres, is federally owned, and most of this is within the Ozark National Forest.

A suitable secondary use for many areas of woodland is grazing. The grasses, legumes, and forbs, and many of the woody plants in the understory of woodland stands can be utilized for forage. Grazing must be controlled so that desirable tree seedlings are not damaged and the forage plants are not overgrazed.

This section gives information about both the production of wood crops and the production of forage in woodland.

[4] MAX D. BOLAR, woodland conservationist, Soil Conservation Service, and IVAN R. PORTER, range conservationist, Soil Conservation Service, helped prepare this section.

sites, recreational facilities, and trafficways

Recreation		Light industry [1]	Trafficways
Campsites or picnic areas	Intensive play areas		
Slight	Slight	Slight	Slight.
Moderate: slope	Moderate: slope	Moderate: slope	Slight.
Severe: slope; poor trafficability; coarse fragments.	Severe: slope; poor trafficability; coarse fragments.	Severe: slope	Moderate: slope.
Severe: slope; poor trafficability.	Very severe: slope; poor trafficability; coarse fragments.	Severe: slope	Severe: slope.
Severe: poor trafficability; flood hazard; moderate if not flooded.	Very severe: poor trafficability; flood hazard; moderate if not flooded.	Severe: flood hazard; slight if not flooded.	Severe: flood hazard; slight if not flooded.
Slight	Slight	Slight	Slight.
Moderate: moderate trafficability.	Severe: moderate trafficability; flood hazard.	Severe: flood hazard	Severe: flood hazard; moderate traffic-supporting capacity.
Severe: poor trafficability	Severe: poor trafficability; flood hazard.	Severe: high water table; flood hazard.	Severe: high water table; flood hazard; moderate traffic-supporting capacity.

TABLE 6.—*Degree and kind of limitation for building*

Soil	Foundations of dwellings [1]	Septic tank filter fields
Dubbs: DbA, DbB, DC For Cleora and Pickwick parts of DC, see Cleora series and Pickwick series.	Slight: severe if subject to flooding.	Slight: severe if subject to flooding.
Enders: EnC2	Moderate: low bearing capacity; high shrink-swell potential.	Very severe: slow percolation.
EnD2, EMD, EsF, EME For Mountainburg part of EMD and EME, see Mountainburg series. For Montevallo part of EMD and EME, see Montevallo: MmD, MmE.	Moderate: low bearing capacity; high shrink-swell potential; severe if slopes exceed 20 percent.	Very severe: slow percolation; most slopes exceed 12 percent.
Falkner: Fc, FlA, FlB	Moderate: moderate to low bearing capacity; high shrink-swell potential in subsoil; high water table; somewhat poor drainage.	Very severe: slow percolation; high water table.
Guthrie: Gt	Severe: moderate to low bearing capacity; high water table; poor drainage.	Very severe: slow percolation; high water table.
Gu	Very severe: high water table; poor drainage; moderate to low bearing capacity; flood hazard.	Very severe: high water table; poor drainage; flood hazard.
Hartsells: HaB, HaC	Slight	Moderate: moderate depth to bedrock.
Holston: HLD, HOD, HLE, HOE, HOF For Enders parts of HOD, HOE, and HOF, see Enders: EnD2.	Moderate if slopes are less than 20 percent; severe if slopes exceed 20 percent.	Moderate if slopes are less than 12 percent; severe if slopes exceed 12 percent.
Iberia: Ib	Severe: low bearing capacity; high shrink-swell potential; high water table; poor drainage.	Very severe: slow percolation; high water table.
Iuka	Severe: flood hazard; occasional high water table.	Severe: flood hazard; occasional high water table.
Leadvale: Lc, LeB, LeC2, LID2	Slight to moderate: occasional high water table.	Very severe: slow percolation; occasional high water table.
Linker: LnB, LnC, LKB, LMB, LnD For Mountainburg part of LMB, see Mountainburg series.	Slight	Moderate: moderate depth to bedrock; severe if slopes exceed 12 percent.
McKamie: MkC	Moderate to severe: high shrink-swell potential; low bearing capacity.	Very severe: slow percolation.
Montevallo: MlC	Severe: shallow over bedrock.	Very severe: slow percolation; shallow over bedrock.
MmD, MmE For Mountainburg part of MmD and MmE, see Mountainburg series.	Severe: shallow over bedrock; very severe if slopes exceed 20 percent.	Very severe: slow percolation; shallow over bedrock; most slopes exceed 12 percent.

See footnote at end of table.

sites, recreational facilities, and trafficways—Continued

Recreation		Light industry [1]	Trafficways
Campsites or picnic areas	Intensive play areas		
Slight	Slight	Slight: severe if subject to flooding.	Slight.
Moderate: moderate trafficability; high erodibility.	Severe: moderate trafficability; high erodibility; low productivity.	Moderate: slope; high shrink-swell potential; high erodibility; low bearing capacity.	Severe: low traffic-supporting capacity; high shrink-swell potential; low strength and stability.
Severe: slope; high erodibility; coarse fragments; poor trafficability.	Very severe: slope; coarse fragments; poor trafficability.	Severe: slope; high shrink-swell potential.	Severe: Low traffic-supporting capacity; high shrink-swell potential; sloughs and slides; low strength and stability.
Moderate: moderate trafficability; high water table; somewhat poor drainage.	Moderate: moderate trafficability; high water table; somewhat poor drainage.	Moderate: moderate to low bearing capacity; high shrink-swell potential in subsoil; high water table; somewhat poor drainage.	Severe: low traffic-supporting capacity; high water table; somewhat poor drainage.
Severe: poor trafficability; high water table; poor drainage.	Very severe: poor trafficability; high water table; poor drainage.	Severe: moderate to low bearing strength; high water table; poor drainage.	Severe: low traffic-supporting capacity; high water table; poor drainage.
Severe: poor trafficability; high water table; poor drainage; flood hazard.	Very severe: poor trafficability; high water table; poor drainage; flood hazard.	Severe: high water table; moderate to low bearing capacity; flood hazard.	Severe: high water table; low traffic-supporting capacity; flood hazard; poor drainage.
Slight	Slight	Slight	Slight.
Severe: slope; poor trafficability; coarse fragments.	Very severe: slope; poor trafficability; coarse fragments.	Severe: slope	Moderate if slopes are less than 20 percent; severe if slopes exceed 20 percent.
Severe: poor trafficability; high water table; poor drainage; clayey surface.	Very severe: poor trafficability; high water table; poor drainage; clayey surface.	Severe: high water table; low bearing capacity; high shrink-swell potential; poor drainage.	Severe: high water table; low traffic-supporting capacity; high shrink-swell potential; poor drainage.
Severe: poor trafficability.	Very severe: poor trafficability; flood hazard.	Severe: flood hazard	Severe: flood hazard.
Slight: moderate if slopes exceed 8 percent.	Slight: moderate if slopes exceed 5 percent.	Slight: moderate if slopes exceed 8 percent.	Moderate: moderate traffic-supporting capacity; moderate erodibility.
Slight: moderate if slopes exceed 8 percent.	Slight: moderate if slopes are 5 to 12 percent; severe if slopes exceed 12 percent.	Slight: moderate if slopes exceed 8 percent.	Slight.
Moderate: moderate trafficability; severe erodibility.	Moderate: moderate trafficability; severe erodibility.	Severe: high shrink-swell potential; low bearing capacity.	Severe: low traffic-supporting capacity; severe erodibility; high shrink-swell potential.
Moderate: severe erodibility; low productivity.	Severe: shallow over bedrock; low productivity; severe erodibility.	Severe: shallow over bedrock	Severe: shallow over bedrock.
Severe: poor trafficability; severe erodibility; low productivity; coarse fragments.	Very severe: poor trafficability; severe erodibility; low productivity; coarse fragments; most slopes exceed 5 percent.	Severe: shallow over bedrock; very severe if slopes exceed 8 percent.	Severe: shallow over bedrock; very severe if slopes exceed 20 percent.

TABLE 6.—*Degree and kind of limitation for building*

Soil	Foundations of dwellings [1]	Septic tank filter fields
Moreland: Mo	Severe: low bearing capacity; high shrink-swell potential; high water table.	Very severe: slow percolation.
Morganfield: Ms	Slight	Slight
Mountainburg: MtB, MtC, MtD, MuD, MuE, MRE. For Rock land part of MRE, see Rock land.	Severe: shallow over bedrock; very severe if slopes exceed 20 percent.	Very severe: shallow over bedrock.
Muldrow: Mw	Severe: low bearing capacity; high shrink-swell potential in subsoil; high water table; somewhat poor drainage.	Very severe: slow percolation; high water table.
Muskogee: MzB, MzC	Severe: moderate to low bearing capacity; high shrink-swell potential in subsoil.	Very severe: slow percolation.
Ora: OrC2	Slight	Severe: slow percolation
Pickwick: PsB2, PsC2	Slight	Slight
Rock land: Ro	Very severe: bedrock at surface.	Very severe: bedrock at surface.
Taft: Tc, TfA, TfB	Severe: high water table; somewhat poor drainage; moderate to low bearing capacity.	Very severe: slow percolation; high water table.
Wing: Wg	Severe: high water table; moderate to low bearing capacity; somewhat poor drainage.	Very severe: slow percolation; high water table.

[1] Engineers and others should not apply specific values to estimated bearing capacity.

sites, recreational facilities, and trafficways—Continued

Recreation		Light industry [1]	Trafficways
Campsites or picnic areas	Intensive play areas		
Severe: poor trafficability; clayey surface.	Severe: poor trafficability; clayey surface.	Severe: high water table; low bearing capacity; high shrink-swell potential.	Severe: high water table; low traffic-supporting capacity; high shrink-swell potential.
Slight	Slight	Slight	Moderate: moderate traffic-supporting capacity.
Severe: poor trafficability; coarse fragments; erosion hazard; low productivity; very severe if slopes exceed 8 percent.	Very severe: poor trafficability; shallow over bedrock; low productivity; coarse fragments.	Severe: shallow over bedrock; very severe if slopes exceed 8 percent.	Severe: shallow over bedrock; very severe if slopes exceed 20 percent.
Severe: poor trafficability; high water table; somewhat poor drainage.	Severe: poor trafficability; high water table; somewhat poor drainage.	Severe: high water table; low bearing capacity; high shrink-swell potential in subsoil.	Severe: high water table; low traffic-supporting capacity; high shrink-swell potential.
Moderate: moderate trafficability.	Moderate: moderate trafficability.	Severe: moderate to low bearing capacity; high shrink-swell potential in subsoil.	Severe: low traffic-supporting capacity; high shrink-swell potential in subsoil.
Slight	Slight	Slight	Slight.
Slight	Slight	Slight	Slight.
Very severe: poor trafficability; bedrock at surface.	Very severe: bedrock at surface; poor trafficability.	Very severe: bedrock at surface.	Very severe: bedrock at surface.
Severe: poor trafficability; high water table; somewhat poor drainage.	Very severe: poor trafficability; high water table; somewhat poor drainage.	Severe: moderate to low bearing strength; high water table; somewhat poor drainage.	Severe: low traffic-supporting capacity; high water table; somewhat poor drainage.
Severe: poor trafficability; low productivity; high water table; somewhat poor drainage.	Very severe: poor trafficability; low productivity; high water table; somewhat poor drainage.	Severe: high water table; somewhat poor drainage; moderate to low bearing capacity.	Severe: low traffic-supporting capacity; high water table; somewhat poor drainage.

Production of Wood Crops

Table 7 gives information that will help owners and operators of woodland to establish, manage, and harvest tree crops. The information is based on detailed plot studies, measurements of different trees on different soils, published and unpublished records, and the experience and judgment of technicians who work with tree crops in this area.

Management of woodland can be planned more effectively if soils are grouped according to those characteristics that affect growth of trees and management of the stands. The soils of Franklin County have been assigned to 17 woodland groups. These groups are listed in table 7. To find the woodland group to which a specified soil has been assigned, refer to the "Guide to Mapping Units" at the back of this survey. Each group consists of soils that are about the same in suitability for wood crops, potential productivity, and management requirements. These factors depend on such soil characteristics as depth; arrangement of layers in the profile; texture, drainage, color, reaction, and consistence of each layer;

TABLE 7.—*Woodland groups, wood*

Woodland group, map symbols, and descriptions of soils	Major hazards and limitations	Potential productivity for wood crops		
		Important wood crops	Estimated site index range	Estimated yearly growth [1]
				Bd. ft./acre, Doyle rule
Group 2o7: Level to nearly level soils on flood plains; high productivity; well suited to southern hardwoods and pines. Ca, CrA, CrB, DC (Cleora part), Ms.	Slight limitations. Occasional overflow of short duration. Unwanted plants must be controlled and grazing animals must be excluded to assure regeneration of broadleaf trees.	Sweetgum Shortleaf pine Loblolly pine Red oak	86–95 76–85 86–95 76–85	270–370 270–370 320–425 160–240
Group 2s8: Level to nearly level, sandy soils on lowlands; high productivity; well suited to southern hardwoods and pines. Br, Bu.	Slight to moderate limitations. The equipment limitation and seedling mortality are moderate, mainly because of the sandy surface layer. Occasional overflow. Unwanted plants must be controlled to assure development of preferred species.	Sweetgum Shortleaf pine Loblolly pine Red oak	86–95 76–85 86–95 76–85	270–370 270–370 320–425 160–240
Group 3o7: Loamy soils; gradient less than 12 percent; moderately high productivity; well suited to native pines, hardwoods, and redcedar. DbA, DbB, DC (Dubbs and Pickwick parts), Lc, LeB, LeC2, LID2, OrC2, PsB2, PsC2.	No serious limitations. Hardwoods must be controlled if pines are to be established.	Shortleaf pine Loblolly pine Red oak	66–75 76–85 66–75	175–260 225–310 100–155
Group 3w5: Wet soils that have a clayey subsoil; moderately high productivity; best suited to lowland hardwoods. Ib, Mo, Mw.	Slight to moderate limitations. The equipment limitation is moderate.	Cottonwood Water oak Sweetgum	76–85 66–75 76–85	200–285 100–155 180–260
Group 3w8: Wet, loamy soils; moderately high productivity; well suited to southern pines, hardwoods, and redcedar. Tc, TfA, TfB.	Slight to moderate limitations. The equipment limitation is moderate; the use of equipment is usually restricted from September through May.	Shortleaf pine Loblolly pine Red oak	66–75 76–85 66–75	175–260 225–310 100–155
Group 3x9: Cobbly soils that formed in alluvium; moderately high productivity; best suited to native hardwoods and pines. Cy.	Severe limitations. The equipment limitation and seedling mortality are severe.	Shortleaf pine Loblolly pine Red oak Sweetgum	66–75 76–85 66–75 76–85	175–260 225–310 100–155 180–260
Group 4o7: Loamy soils on uplands; gradient less than 12 percent; moderate productivity; best suited to native pines, hardwoods, and redcedar. ADB, AgC, AgD, HaB, HaC, LKB, LMB (Linker part), LnB, LnC, LnD.	No serious limitations	Shortleaf pine Loblolly pine Red oak	56–65 66–75 56–65	95–170 140–215 —90
Group 4r9: Rolling to very steep, loamy soils on uplands; moderate productivity; best suited to native pines and hardwoods. ADD, ADE, AED (Allen part), AEE (Allen part), AEF (Allen part), AMD (Allen and Linker parts), AME (Allen part), AMF (Allen and Holston parts), HLD, HLE, HOD (Holston part), HOE (Holston part), HOF (Holston part).	Slight to severe limitations. The erosion hazard and the equipment limitation are moderate if the gradient is less than 25 percent, and severe if it is more than 25 percent. Seedling mortality is slight on north- and east-facing slopes and moderate on south- and west-facing slopes.	Shortleaf pine. Loblolly pine Red oak	56–65 66–75 56–65	95–170 140–215 —90

See footnotes at end of table.

content of humus and minerals; degree of erosion; and slope. Also considered was slope aspect, or exposure.

The column headings in table 7 are explained in the following paragraphs.

Major hazards and limitations: Under this heading are given the nature and degree of soil-related limitations that present problems in the management of woodland.

Equipment limitation refers to soil characteristics and topographic features that restrict or prohibit the use of conventional equipment for planting, road construction, control of unwanted vegetation, harvesting of tree crops, and fire control. The limitations in Franklin County are caused mainly by slope. Other limiting factors are texture of the surface layer, wetness, frequency and duration of overflow, and the number and size of surface stones. The limitation is slight if the slope is less than 15 percent, if the soils are at least moderately well drained and are not subject to overflow or excessive surface water, and if the use of equipment is restricted for only a short period after a heavy rain. The limitation is moderate if the slope is within the range of 15 to 40 per-

crops, and woodland forage

Preferred species—		Understory vegetation utilized as forage	
In existing stands	For planting	Principal plants (excellent condition)	Estimated yields by canopy class
			Lb. air-dry forage/acre
Black walnut, cottonwood, Shumard oak, loblolly pine, sweetgum, sycamore, shortleaf pine, black locust, cherrybark oak, black cherry, water oak, red oak, green ash.	Black walnut, cottonwood, Shumard oak, loblolly pine, sweetgum, sycamore, shortleaf pine, black locust, cherrybark oak, black cherry.	Big bluestem, little bluestem, eastern gamagrass, Virginia wildrye, switchgrass, beaked panicum, switchcane, prairie dock, compass plant.	Open canopy 3,000–7,500; sparse 2,500–4,500; medium 1,000-2,500; dense 400–1,800.
Black walnut, cottonwood, Shumard oak, sweetgum, loblolly pine, shortleaf pine, sycamore, red oak, water oak, green ash, black locust, persimmon.	Black walnut, cottonwood, Shumard oak, sweetgum, loblolly pine, shortleaf pine, sycamore.	Big bluestem, switchgrass, Virginia wildrye, velvetgrass, switchcane, sedges, low panicum.	Open canopy 5,000–8,000; sparse 3,000–7,000; medium 1,500–3,500; dense 200–2,500.
Black walnut, black locust, loblolly pine, shortleaf pine, red oak, sweetgum, white oak, redcedar.	Black walnut, black locust, loblolly pine, shortleaf pine, red oak, redcedar.	Virginia wildrye, little bluestem, plumegrass, big bluestem, switchgrass, low panicum.	Open canopy 3,000–7,000; sparse 2,000–4,500; medium 1,000–2,500; dense 0–1,000.
Green ash, cottonwood, hackberry, Nuttall oak, cherrybark oak, sweetgum, sycamore, persimmon.	Green ash, cottonwood, Nuttall oak, sweetgum, sycamore.	Virginia wildrye, plumegrass, big bluestem, switchgrass, low panicum.	Open canopy 4,000–7,000; sparse 3,000–5,000; medium 1,500–3,500; dense 0–2,000.
Shortleaf pine, loblolly pine, red oak, sweetgum, water oak, green ash, redcedar.	Shortleaf pine, loblolly pine, red oak, sweetgum, water oak, green ash.	Switchgrass, eastern gamagrass, Florida paspalum, big bluestem, plumegrass, longspike tridens, beaked panicum.	Open canopy 4,000–6,000; sparse 2,500–4,500; medium 500–3,000; dense 0–2,000.
Cottonwood, sycamore, sweetgum, red oak, green ash, shortleaf pine, black walnut, black locust, Shumard oak.	Cottonwood, sycamore, sweetgum, red oak, shortleaf pine, Shumard oak.	Virginia wildrye, switchgrass, broadspike uniola, eastern gamagrass, sunflower, goldenrod.	Open canopy 2,000–5,000; sparse 1,000–3,500; medium 500–2,000; dense 200–500.
Shortleaf pine, loblolly pine, red oak, black walnut, sweetgum, redcedar, black locust, black cherry.	Shortleaf pine, loblolly pine, redcedar.	Little bluestem, big bluestem, indiangrass, switchgrass, wildrye, low panicum, native lespedezas, perennial sunflowers.	Open canopy 2,500–6,000; sparse 2,000–4,000; medium 500–2,000; dense 0–1,000.
Shortleaf pine, loblolly pine, redoak, black walnut, sweetgum, redcedar, black locust, black cherry.	Shortleaf pine, loblolly pine, white oak, redcedar.	Little bluestem, big bluestem, indiangrass, wildrye, perennial sunflowers, silphiums, native lespedezas.	Open canopy 2,500–6,000; sparse 2,000–4,000; medium 500–2,500; dense 0–1,000.

TABLE 7.—*Woodland groups, wood*

Woodland group, map symbols, and descriptions of soils	Major hazards and limitations	Potential productivity for wood crops		
		Important wood crops	Estimated site index range	Estimated yearly growth [1]
				Bd. ft./acre, Doyle rule
Group 4r3: Rolling to very steep soils that have a clayey subsoil; on uplands; moderate productivity; best suited to redcedar and native pines. AED (Enders part), AEE (Enders part), AEF (Enders part), EMD (Enders part), EME (Enders part), HOD (Enders part), HOE (Enders part), HOF (Enders part), EnD2.	Slight to severe limitations. The erosion hazard and the equipment limitation are moderate to severe. Seedling mortality is slight to moderate.	Shortleaf pine. Loblolly pine Redcedar	56–65 66–75 36–45	95–170 140–215 100–145
Group 4x8: Stony soils on uplands; gradient 8 to 45 percent; moderate productivity; suited to native pines, hardwoods, and redcedar. AsD, AsE.	Slight to moderate limitations. The equipment limitation and the erosion hazard are moderate. Seedling mortality is slight on north- and east-facing slopes and moderate on south- and west-facing slopes.	Shortleaf pine Loblolly pine Red oak Redcedar	56–65 66–75 56–65 36–46	95–170 140–215 60–90 100–145
Group 4o1: Loamy soils on uplands; gradient 3 to 8 percent; moderate productivity; best suited to native pines and redcedar. EnC2, MkC, MzB, MzC.	No serious limitations. Control of hardwoods is generally needed in order to maintain pure stands of pine or redcedar.	Shortleaf pine Loblolly pine Redcedar	56–65 66–75 36–45	95–170 140–215 ----------
Group 5d3: Shallow soils on uplands; low productivity; best suited to native pines and redcedar; difficult to establish and maintain well-stocked stands. AMD (Mountainburg part), AME (Mountainburg part), AMF (Mountainburg part), EMD (Mountainburg and Montevallo parts), EME (Mountainburg and Montevallo parts), LMB (Mountainburg part), MRE (Mountainburg part), MIC, MmD, MmE, MtB, MtC, MtD.	Moderate to severe limitations. The erosion hazard, the equipment limitation, and seedling mortality are moderate to severe, depending on the gradient and the exposure.	Shorleaf pine Loblolly pine Redcedar	46–55 56–65 26–35	50–85 50–150 ----------
Group 5x3: Stony soils on uplands; low productivity; best suited to native pines and redcedar; difficult to maintain well-stocked stands. EsF, MuD, MuE.	Moderate to severe limitations. The erosion hazard is moderate. The equipment limitation is severe. Seedling mortality is moderate on north- and east-facing slopes and severe on south- and west-facing slopes.	Shortleaf pine Loblolly pine Redcedar	46–55 56–65 26–35	50–85 50–150 ----------
Group 5w8: Level to nearly level, wet soils on uplands; low productivity, but will support stands of pines and hardwoods. Fc, FlA, FlB.	Slight to moderate limitations. The equipment limitation is moderate. Seedling mortality is slight to moderate.	Shortleaf pine Loblolly pine Sweetgum Water oak	46–55 56–65 56–65 56–65	85 50–150 90 90
Group 5w5: Wet soils; low productivity, but will support stands of water-tolerant hardwoods. Gt, Gu.	Moderate to severe limitations. The equipment limitation is moderate. Seedling mortality is severe.	Sweetgum Water oak	56–65 56–65	90 90
Group 5x8: Rocky soils on uplands; very low productivity, but will support stands of shortleaf pine, redcedar, and upland hardwoods. MRE (Rock land part), Ro.	Severe limitations. The equipment limitation and seedling mortality are severe.	Shortleaf pine Redcedar	30–50 ----------	---------- ----------
Group 5t0: Soils high in exchangeable sodium; not suitable for production of timber of commercial quality. Wg.				

[1] Yields shown for cottonwood are for fully stocked, even-aged stands to age 30; those shown for other species are for well-stocked, even-aged stands to age 60. The yields for pines are adapted from published research on pine (*10*). The yields for hardwoods are adapted from published research on southern hardwoods (*13*, *15*) and tree-growth data from soil-site studies by the U.S. Soil Conservation Service, the U.S. Forest Service, and the Arkansas State Forestry Commission.

crops, and woodland forage—Continued

Preferred species—		Understory vegetation utilized as forage	
In existing stands	For planting	Principal plants (excellent condition)	Estimated yields by canopy class
Loblolly pine, shortleaf pine, redcedar.	Loblolly pine, shortleaf pine, redcedar.	Little bluestem, indiangrass, big bluestem, wildrye, purple lovegrass, native lespedezas, sensitivebrier.	*Lb. air-dry forage/acre* Open canopy 2,500–5,000; sparse 1,500–4,000; medium 1,000–3,000; dense 200–1,500.
Shortleaf pine, loblolly pine, redcedar, red oak, black locust [2] black walnut [2], black cherry.	Shortleaf pine, redcedar	Little bluestem, big bluestem, indiangrass, plumegrass, wildrye, native lespedezas.	Open canopy 2,500–6,000; sparse 1,500–4,000; medium 500–2,500; dense 0–1,000.
Loblolly pine, shortleaf pine, redcedar.	Loblolly pine, shortleaf pine, redcedar.	Big bluestem, little bluestem, indiangrass, switchgrass, wildrye, perennial sunflowers, silphiums, native legumes.	Open canopy 5,000–7,000; sparse 3,000–6,000; medium 1,000–3,500; dense 0–1,000.
Shortleaf pine, loblolly pine, redcedar.	Shortleaf pine, loblolly pine, redcedar.	Little bluestem, indiangrass, big bluestem, low panicums, native legumes, forbs.	Open canopy 2,000–4,800; sparse 1,500–3,500; medium 1,000–2,000; dense 0–1,000.
Shortleaf pine, loblolly pine, redcedar.	Shortleaf pine, loblolly pine, redcedar.	Little bluestem, indiangrass, big bluestem, Canada wildrye, sensitivebrier, native lespedezas.	Open canopy 1,500–4,800; sparse 1,000–4,000; medium 500–1,500; dense 0–750.
Shortleaf pine, loblolly pine, sweetgum, water oak, green ash.[3]	Shortleaf pine, loblolly pine, sweetgum, green ash.	Big bluestem, switchgrass, little bluestem, indiangrass, prairie alfalfa, ashy sunflower.	Open canopy 4,200–5,500; sparse 3,000–4,500; medium 1,000–3,500; dense 500–2,000.
Sweetgum, green ash, water oak.[3]	Sweetgum	Little bluestem, switchgrass, big bluestem, Florida paspalum, beaked panicum, sedges.	Open canopy 4,000–7,500; sparse 3,000–6,000; medium 1,000–4,000; dense 0–1,500.
Shortleaf pine, redcedar		Little bluestem, indiangrass, Canada wildrye, starved panicum, prairie clover, stiffleaf sunflower.	Open canopy 750–2,200; sparse 500–1,800; medium 300–1,500; dense 250–800.

[2] On north- and east-facing slopes that are in coves, on benches, or at the base of slopes.
[3] All to be managed in small saw log rotations.

cent, if the soils are not subject to periodic overflow or excessive surface water for extended periods, if stoniness or rockiness is not severe, and if equipment can be used from March to December. The limitation is severe if the slope is more than 40 percent, if the soils are extremely stony or rocky, and if the use of equipment is limited to the driest months or to periods between overflows.

Seedling mortality refers to the expected loss of seedlings during the first two growing seasons after planting. Loss of seedlings in this county is caused mainly by droughtiness. Slope and aspect, soil depth and texture, and the number of stones and rocks on the surface are also major factors. Mortality is slight if less than 25 percent of planted seedlings die and adequate natural regeneration ordinarily occurs. Mortality is moderate if between 25 and 50 percent of planted seedlings die, natural regeneration cannot be relied on without site preparation, and replanting is necessary. Mortality is severe if more than 50 percent of the planted seedlings die, natural regeneration cannot be relied on, and special site preparation and replanting are necessary.

Erosion hazard depends on the steepness of the slope, the erodibility of the soil, and the soil depth.

Potential productivity: The important wood crops for the soils of each group are listed under this heading, and each is rated according to site index range and average yearly growth. Site index range is the average height of the dominant trees in a stand, at age 30 for cottonwood, at age 35 for sycamore, and at age 50 for other species. The higher the site index range, the higher the potential productivity of the soil for wood crops. The average yearly growth in board feet per acre is calculated by the Doyle rule, to age 30 for cottonwood and age 60 for other species, of well-stocked, even-aged stands.

Preferred species: Under this heading are listed the kinds of trees to be favored in existing stands and the kinds to be chosen for planting in establishing a stand. Species were selected on the basis of their growth and of the quality, value, and marketability of the products obtained from each.

Production of Forage

The amount of forage produced in a woodland area varies with the age of the trees, the density of the canopy, and the condition of the understory vegetation. For the purposes of this survey, four canopy classes are recognized. An open canopy shades up to 20 percent of the ground at midday; a sparse canopy, 21 to 35 percent; a medium canopy, 36 to 55 percent; and a dense canopy, 56 to 70 percent. The potential yields of forage, by canopy classes, for each woodland group are shown in table 7.

Forage condition is the present state of the understory vegetation as compared with the potential for a particular site. Four classes of forage condition are recognized. They provide a measure of any deterioration that has taken place and a basis for predicting the degree of improvement that can be brought about by management. Excellent forage condition indicates that the present forage is more than 75 percent of its potential; good condition, between 51 and 75 percent; fair condition, between 26 and 50 percent; and poor condition, less than 25 percent.

The principal forage plants listed in table 7 are those that produce most of the forage when the vegetation is in excellent condition and the canopy is 45 percent or less. As the canopy closes, the plants are replaced by shade-tolerant, woody species and forage yields become progressively lower.

Use of the Soils for Range [5]

About 17,000 acres in the southwestern part of the county is native grass prairie. On the well-managed range and meadow fields, the vegetation consists of numerous legumes and forbs and a mixture of tall grasses, chiefly big bluestem, little bluestem, switchgrass, and indiangrass.

About 100,000 acres in the county is savannah, commonly referred to as noncommercial woodland. This acreage is potential rangeland. Much of it is now producing below its capacity. Control of brush and of low-grade hardwoods would improve production and allow the tall grasses to recover.

Range Sites and Condition Classes

Different kinds of soils produce different kinds of grass and other vegetation. The soils that have similar climatic and physiographic features and that produce about the same kinds of plants and about equal yields of forage are grouped together for range management purposes. These groups are called range sites. Each range site has its own distinctive potential for producing native plants and retains its ability to reproduce this plant community unless the soils are materially altered or have deteriorated.

Range condition is determined mainly by comparing the kinds and relative proportions of plants that make up the existing vegetative cover with those in the potential native plant cover, or climax vegetation, for the same site.

Climax vegetation, or potential native plant cover, is the stabilized plant community on a particular site. It reproduces itself and does not change so long as the environment remains unchanged. *Decreasers* are plants in the climax vegetation that tend to decrease if heavily grazed. These plants generally are the tallest, most productive, and most palatable perennials. *Increasers* are plants in the climax vegetation that normally increase as the decreasers decrease. These plants commonly are the shorter, less productive, less palatable plants. *Invaders* are plants that are not part of the climax vegetation but that become established after the climax vegetation has been heavily grazed. Many invaders are woody plants; some are herbaceous perennials and annuals. They may originate nearby or at a great distance.

Range condition indicates the degree to which the composition of the existing plant community differs from the climax vegetation. Four classes are recognized. A

[5] IVAN R. PORTER, range conservationist, Soil Conservation Service, helped to prepare this section.

range is in *excellent* condition if 76 to 100 percent of the vegetation is of the same kind as that in the original stand; it is in *good* condition if the percentage is between 51 and 75; in *fair* condition if the percentage is between 26 and 50; and in *poor* condition if the percentage is 25 or less.

A range site in excellent condition is at or near its maximum productivity. Its plant cover adequately protects the soil and improves moisture intake and soil fertility. A site in good condition has lost a few decreaser plants, but it is still productive and can be maintained and improved by good management of grazing. A site in fair condition has a severely altered plant community in which increasers dominate and invaders are becoming prominent. Generally the amount of litter is inadequate for protection against compaction and erosion. Brush control and deferred grazing are needed. A site in poor condition has lost almost all of the desirable forage plants, has few plants that are part of the original vegetation, and has many invaders.

Recognizing changes in the plant cover is one of the most important factors in good range management. Often the changes are overlooked or misunderstood. Growth following heavy rainfall, for example, may appear to improve the condition of the site, when actually the cover is weedy and productivity is declining.

Descriptions of Range Sites

Five range sites are recognized in Franklin County. They do not include all the soils of the county but only those used exclusively or mainly as native range. The "Guide to Mapping Units" shows the range site classification of each of these soils.

The five range sites are described in the following paragraphs. The soil series represented are named in the description of each site, but this does not mean that all the soils of a given series are in the site.

Each site description includes estimates of total herbage yield, one for favorable years and one for unfavorable years. These estimates represent total air-dried herbage clipped at ground level from random plots. The amount of actual usable forage or of mowed hay is considerably less. After a year or two of favorable rainfall, the total production is likely to be more than the higher estimate, and after a drought, it is likely to be less than the lower estimate.

Alkali Flats range site

The one soil in this site, Wing silt loam, is alkaline, somewhat poorly drained to moderately well drained, and very slowly permeable. The root zone is shallow, and the available water capacity is low. The surface layer is silt loam, and the subsoil is silty clay or silty clay loam. This soil is extremely hard when dry and very firm when moist. It contains large amounts of sodium and magnesium.

In excellent condition, this site produces moderately small amounts of switchgrass, paspalum, indiangrass, and little bluestem. As the condition of the site deteriorates, these plants are replaced by three-awn, dropseed. sedge, and low brushy woody species.

In favorable years, forage production is about 3,800 pounds per acre. In unfavorable years, it is about 2,000 pounds per acre.

Loamy Prairie range site

This site consists of soils of the Falkner series. These are deep, somewhat poorly drained, very slowly permeable soils on uplands. Their surface layer is silt loam. Their subsoil is a claypan. The available water capacity is moderate.

If this site is in excellent condition, it produces large amounts of big bluestem, little bluestem, switchgrass, indiangrass, prairie alfalfa, ashy sunflower, and leadplant. If it is in poor condition, the better forage plants are replaced by dropseed, three-awn, broomsedge, windmillgrass, ragweed, and ironweed.

In favorable years, forage production is about 5,500 pounds per acre. In unfavorable years, it is about 4,200 pounds per acre.

Sandstone Ledge range site

Areas of Rock land make up this site. Exposures or outcrops of sandstone form ledges over much of the area. Between the outcrops are pockets of shallow soil material, which is sandy, droughty, and low in plant nutrients.

If this site is in excellent condition, little bluestem is dominant; there are small amounts of indiangrass, wildrye, starved panicum, prairie clover, and perennial sunflower, and woody plants make up only about 15 percent of the plant composition. As the condition of the site deteriorates, these plants are replaced by three-awn, dropseed, broomsedge, splitbeard bluestem, and annuals, and woody plants become more abundant.

In favorable years, forage production is about 2,200 pounds per acre. In unfavorable years, it is about 750 pounds per acre.

Sandstone Ridge range site

This site consists of soils of the Mountainburg series. These are rapidly permeable soils that are shallow over hard, massive sandstone. They are stony or gravelly throughout. They are low in plant nutrients and have low available water capacity.

If this site is in excellent condition, the vegetation is about 75 percent little bluestem and about 15 percent indiangrass, big bluestem, low panicum, native legumes, and forbs. There are also scattered post oak, blackjack oak, and hickory trees. If the range is in poor condition, the vegetation consists chiefly of three-awn, dryland sedge, broomsedge, splitbeard bluestem, annuals, and woody plants.

In favorable years, forage production is about 4,800 pounds per acre. In unfavorable years, it is about 2,000 pounds per acre.

Shale Break range site

This site consists of soils of the Montevallo series. These are gravelly or stony silt loams or fine sandy loams that are shallow over shale. They are low in available water capacity and low in natural fertility.

This site supports a mixture of tall and mid grasses and scattered forbs. Little bluestem, big bluestem, indiangrass, Canada wildrye, sensitivebrier, and native lespedeza occupy the better parts of a site that is in excellent condition, and starved panicgrass, little bluestem, and sensitivebrier occupy the poorer parts. As the condition of the range deteriorates, these plants are replaced by three-awn, dropseed, broomsedge, ragweed, white snakeroot, and ironweed.

In favorable years, forage production is about 3,200 pounds per acre. In unfavorable years, it is about 1,500 pounds per acre.

Use of the Soils for Wildlife[6]

Wildlife resources in a given area depend on land use, the kind and amount of vegetation, and the abundance of clear-water ponds, lakes, and streams, all of which are governed by characteristics of the soils. Wildlife habitat can be improved by planting choice food plants, managing existing vegetation, and locating water impoundments where water is scarce.

The soils of Franklin County have been assigned to 12 groups according to their suitability as habitat for wildlife. These groups are listed in table 8. To find the wildlife group to which a specified soil has been assigned, refer to the "Guide to Mapping Units" at the back of this survey. Table 8 gives a brief description of the soils, by groups, and shows their suitability for the important elements of wildlife habitat and their suitability for different classes of wildlife.

HABITAT ELEMENTS.—The elements shown in table 8 are defined in the following paragraphs.

GRAIN AND SEED CROPS: Agricultural grains or seed-producing annuals planted to produce food for wildlife. Examples are corn, sorghum, wheat, oats, millet, soybeans, and sunflowers.

GRASSES AND LEGUMES: Domestic perennial grasses and herbaceous legumes that are established by planting and that furnish wildlife food and cover. Examples are fescue, bermudagrass, bahiagrass, panicgrass, clover, and alfalfa.

WILD HERBACEOUS UPLAND PLANTS: Native or introduced perennial grasses and forbs (weeds) that provide food and cover principally to upland forms of wildlife, and that are established mainly through natural processes. Examples are bluestem, indiangrass, pokeweed, strawberries, wild lespedeza, tickclover, wild beans, wild peas, and partridgepeas.

HARDWOOD WOODLAND PLANTS: Nonconiferous trees, shrubs, and woody vines that produce fruits, nuts, seeds, buds, and twigs and foliage (browse) used extensively by wildlife; plants commonly are established through natural processes but also may be planted. Examples are oak, beech, cherry, dogwood, viburnum, maple, blueberry, honeysuckle, blackberry, greenbrier, wild grape, and multiflora rose.

CONIFEROUS WOODLAND PLANTS: Cone-bearing trees and shrubs, important to wildlife mainly as cover but to some extent as food, in the form of browse, seeds, or fruitlike cones; plants commonly are established through natural processes but also may be planted. Examples are pine, cedar, and juniper.

WETLAND FOOD AND COVER PLANTS: Annual and perennial, domestic or wild, herbaceous plants, of moist or wet sites, that produce food and cover used by wetland forms of wildlife. Examples are rice, smartweed, wild millet, rice cutgrass, cattails, naiads, pondweeds, water lilies, and Sesbania.

SHALLOW WATER DEVELOPMENTS: Impoundments or excavations for control of water, generally not exceeding 6 feet in depth. Examples are rice fields and shallow impoundments or water-level controls on flood plains.

PONDS: Impounded or dug-out areas that have water of suitable depth, of suitable quality, and in ample supply for production of fish or wildlife.

CLASSES OF WILDLIFE.—As shown in table 8, there are three classes of wildlife.

Openland wildlife consists of farm game, such as bobwhites, doves, and rabbits; woodland wildlife of forest game, such as deer, turkeys, and squirrels; and wetland wildlife of waterfowl, such as wood ducks, mallards, and Canadian geese.

Formation and Classification of the Soils

This section describes the major factors of soil formation, tells how these factors have affected the soils of Franklin County, explains some of the principal processes in horizon development, and defines the current system for classifying soils. This section also shows the results of analysis of selected soils in the county.

Factors of Soil Formation

Soil is formed by the interaction of climate, living organisms (especially vegetation), parent material, and relief over a period of time. Each of these factors modifies the effect of the other four. Significant differences in one of the factors result in differences in soil characteristics.

Climate and vegetation are the active forces in soil formation. Relief, mainly by its influence on runoff, erosion, and temperature, modifies the effects of climate and vegetation. The parent material also affects the kind of profile that can be formed and, in extreme cases, determines it almost entirely. Finally, time is needed for the changing of the parent material into soil.

Climate

The climate of Franklin County is characterized by long warm summers, short mild winters, and occasional periods of intense cold and snow, of short duration. The average daily maximum temperature for January is 50 degrees, and that for July is 93 degrees. The average annual rainfall is about 45 inches and is distributed fairly uniformly throughout the year. More detailed information about the climate is given in the section "General Nature of the County."

[6] ROY A. GRIZZELL, biologist, Soil Conservation Service, helped prepare this section.

The warm, moist climate promotes rapid chemical reactions and rapid soil formation. Abundant rainfall favors the rapid leaching of soluble and colloidal materials (*11*). Plant remains decompose rapidly, and the organic acids thus produced hasten the removal of bases and the development of clay minerals. These processes prevent the accumulation of large amounts of organic matter in the soils. Because the soil freezes for only short periods, soil formation continues almost the year round. Mechanical action caused by freezing and thawing in the rocks is almost nonexistent.

The climate is relatively uniform within the county. Temperatures are somewhat lower in the coves, on the north-facing slopes, and on the higher hilltops and mountaintops, but are not low enough to account for any significant differences among the soils. Probably the climate has not changed much while the soils have been forming.

Living organisms

Higher plants and animals, as well as insects, bacteria, and fungi, are important in the formation of soils. Living organisms account for gains in organic matter and nitrogen in the soil, gains or losses in plant nutrients, and changes in structure and porosity. Trees are active in soil formation through both the mechanical and the chemical actions of roots in the soil and rock materials. The roots help in keeping the soil supplied with minerals by bringing up elements from the substrata to the surface layer, in a form that is usable to plants. The decayed leaves on the surface are an important source of organic matter.

Man's activities are important also (*7*). Cultivation and fertilization and the removal of crops all affect properties of the soils. Changing the plant cover is likely to accelerate erosion. Erosion, in turn, is likely to modify the texture of the surface layer and change the tilth of the soils. The soils in Franklin County have not been farmed long enough to have been changed significantly by man's activity.

The native vegetation and the associated complex communities of bacteria and fungi generally have had a greater influence on soil formation in this county than the higher animals and insects.

The native vegetation in most of the mountainous and hilly areas of the county consisted of forests of blackjack oak, post oak, white oak, red oak, hickory, and yellow pine. Only the uppermost few inches of the soils in these areas have a significant accumulation of organic matter and are dark colored. Allen, Enders, Hartsells, Holston, Leadvale, Linker, Montevallo, and Mountainburg soils formed on these uplands. They differ chiefly in age and degree of weathering, in relief, and in the kind of parent material.

The prairies in the southern part of Franklin County supported a luxuriant growth of tall bunch grasses, forbs, and marsh grasses, and a sparse growth of oak and locust. The soils, mainly the Falkner, Taft, Guthrie, and Wing soils, do not have the thick, dark-colored surface layer commonly associated with prairie soils. Apparently, their characteristics were influenced more by parent material and relief than by vegetation.

On the alluvial areas and bottom lands, the native vegetation consisted of cottonwood, willow, hackberry, elm, sycamore, ash, oak, and hickory. Bruno, Caspiana, Cleora, Dubbs, Morganfield, and Moreland soils formed in these areas. They differ from each other chiefly because of the effects of parent material and age.

Parent material

In the northern half of the county the soils formed in material weathered from acid sandstone, siltstone, and shale of the Atoka Formation (fig. 18), which is part of the Pennsylvanian System of the Paleozoic Era (*4*). Of these rocks the sandstone is the most resistant to weathering. The mountains are capped with the resistant sandstone, which weathers to a sandy regolith. The Linker, the Hartsells, and the shallow Mountainburg soils formed in this material.

The soils on benches along the mountainsides formed in friable, loamy and silty material that washed or rolled down from a high elevation. These are chiefly soils of the Allen and Holston series. They are deep, medium textured, acid, and well drained. In many places they are stony or gravelly, because coarse fragments of sandstone have rolled down from the caprock on the bluffs.

***Figure 18.*—Vertical cut showing alternate beds of sandstone, siltstone, and shale of the Atoka Formation.**

TABLE 8.—*Suitability of soils for wildlife*

Wildlife groups, descriptions of soils, and map symbols	Wildlife habitat elements			
	Grain and seed crops	Grasses and legumes	Wild herbaceous upland plants	Hardwood woodland plants
Group 1: Deep, well-drained soils on flood plains; silt loam to fine sandy loam surface layer; sandy loam, silt loam, or silty clay loam subsoil. Bu (Iuka part), Ca, CrA, CrB, DC, DbA, DbB, Ms.	Well suited	Well suited	Well suited	Well suited
Group 2: Deep, moderately well drained to poorly drained soils on flood plains; silt loam to clay surface layer; plastic clay subsoil. Ib, Mo, Mw.	Well suited to suited.	Well suited to suited.	Well suited to suited.	Well suited to suited.
Group 3: Deep, excessively drained, rapidly permeable loamy sand. Br, Bu (Bruno part).	Poorly suited	Poorly suited	Poorly suited	Poorly suited
Group 4: Moderately well drained to somewhat poorly drained soils; fine sandy loam to silt loam surface layer; fragipan or claypan at a depth of 14 to 31 inches. Fc, FlA, FlB, Lc, LeB, LeC2, LlD2, OrC2, Tc, TfA, TfB.	Suited	Suited	Suited	Well suited to suited.
Group 5: Deep, poorly drained soils; silt loam surface layer; fragipan at a depth of 12 to 20 inches. Gt, Gu.	Poorly suited	Poorly suited	Poorly suited	Suited
Group 6: Deep to moderately deep, sloping, well-drained, moderately permeable soils; fine sandy loam surface layer; sandy clay loam or silty clay loam subsoil. ADB, AgC, HaB, HaC, LKB, LMB (Linker part) LnB, LnC, PsB2, PsC2.	Well suited to suited.	Well suited	Well suited	Well suited to suited.
Group 7: Deep to moderately deep, strongly sloping to steep, well-drained soils; fine sandy loam to silt loam surface layer; sandy clay loam to clay subsoil. AgD, ADD, ADE, AED, AEE, AMD (Allen part), AME (Allen part), EnD2, EMD (Enders part), EME (Enders part), HLD, HLE, HOD, HOE, LnD.	Suited to poorly suited.	Suited to poorly suited.	Suited to poorly suited.	Well suited to suited.
Group 8: Shallow to deep, very steep, well-drained, stony and gravelly soils; fine sandy loam surface layer; sandy clay loam to clay subsoil. AEF, AMF (Allen and Holston parts), HOF.	Unsuited	Unsuited	Unsuited	Poorly suited
Group 9: Deep, sloping, well drained to moderately well drained soils; silt loam surface layer; clay or silty clay subsoil. EnC2, MzB, MzC, MkC.	Suited	Suited	Suited	Well suited
Group 10: Shallow, well-drained to somewhat excessively drained, sloping to steep soils; gravelly sandy loam or gravelly silt loam surface layer; sandstone or shale within a depth of 20 inches. AMD (Mountainburg part), AME (Mountainburg part), AMF (Mountainburg part), EMD (Mountainburg and Montevallo parts), EME (Mountainburg and Montevallo parts), LMB (Mountainburg part), MIC, MmD, MmE, MRE, MtB, MtC, MtD, MuD, MuE, Ro.	Poorly suited to unsuited.	Poorly suited to unsuited.	Poorly suited to unsuited.	Poorly suited to unsuited.
Group 11: Deep, strongly sloping to steep, well-drained, stony and cobbly soils; stony fine sandy loam surface layer; sandy clay loam to clay subsoil. AsD, AsE, Cy, EsF.	Poorly suited to unsuited.	Poorly suited to unsuited.	Poorly suited to unsuited.	Poorly suited to unsuited.
Group 12: Deep, alkaline soils high in sodium; silt loam surface layer; silty clay or clay subsoil. Wg.	Unsuited	Unsuited	Unsuited	Unsuited

habitat elements and classes of wildlife

Wildlife habitat elements—Continued				Classes of wildlife		
Coniferous woodland plants	Wetland food and cover plants	Shallow water developments	Ponds	Openland	Woodland	Wetland
Well suited to suited.	Suited to poorly suited.	Poorly suited	Poorly suited to unsuited.	Well suited	Well suited	Suited to poorly suited.
Poorly suited to unsuited.	Well suited to suited.	Well suited to suited.	Well suited to suited.	Well suited to suited.	Well suited	Well suited to suited.
Poorly suited	Unsuited	Unsuited	Unsuited	Poorly suited	Poorly suited	Unsuited.
Suited to poorly suited.	Suited to poorly suited.	Suited to poorly suited.	Well suited to suited.	Suited	Well suited to suited.	Suited to poorly suited.
Poorly suited	Well suited	Well suited	Suited to poorly suited.	Poorly suited	Suited	Well suited.
Well suited	Unsuited	Unsuited	Poorly suited	Well suited	Well suited	Poorly suited.
Unsuited	Unsuited	Poorly suited to unsuited.	Poorly suited to unsuited.	Suited to poorly suited.	Well suited to suited.	Poorly suited to unsuited.
Poorly suited	Unsuited	Unsuited	Unsuited	Poorly suited	Poorly suited	Unsuited.
Well suited to suited.	Suited to poorly suited.	Well suited to suited.	Well suited to suited.	Well suited to suited.	Well suited to suited.	Suited to poorly suited.
Poorly suited to unsuited.	Poorly suited to unsuited.	Poorly suited to unsuited.	Poorly suited to unsuited.	Poorly suited to unsuited.	Poorly suited to unsuited.	Poorly suited to unsuited.
Poorly suited to unsuited.	Poorly suited to unsuited.	Poorly suited to unsuited.	Poorly suited to unsuited.	Poorly suited to unsuited.	Poorly suited to unsuited.	Poorly suited to unsuited.
Unsuited	Unsuited	Well suited	Suited	Unsuited	Unsuited	Suited.

The soils in valleys and on slopes where shale was originally exposed formed in plastic, mottled red and gray, very strongly acid clay that was covered by a thin layer of loamy material and sandstone fragments, both of which washed or rolled down from a higher elevation. The Enders soils formed in this material. Thus, they have a gravelly or stony, loamy surface layer. The steep Montevallo soils formed on the mountainsides in material weathered from shale.

In strips about 2 to 8 miles wide that cross the county from east to west on both sides of the Arkansas River, the Atoka Formation is overlain by the Hartshorne Sandstone, which is a massive sandstone 20 to 30 feet thick. The Linker, Hartsells, and Mountainburg soils are derived from this material. Along the colluvial slopes are the Allen, Leadvale, and Ora soils. In the valleys and along the lower slopes of the hillsides and mountainsides are exposures of shale of the underlying Atoka Formation. The Enders and Montevallo soils formed in the shaly residuum.

In a strip 1 to 3 miles wide in the southern part of Franklin County is the Spadra Shale Formation, which consists of sandy and clayey shale. Its southern boundary is along Hurricane Creek. The soils derived from this material are the level and gently sloping, poorly drained to somewhat poorly drained, silty or clayey Falkner, Guthrie, and Taft soils; the sloping, moderately well drained, silty Leadvale soils; and the strongly sloping Enders and Montevallo soils.

In an area of about 24 square miles in the southwestern corner of the county, south of Charleston, is the Paris Shale Formation. It is lighter colored than the Spadra Shale. The soils derived from this material are those of the Falkner, Guthrie, and Taft series. They are similar in kind and pattern to those derived from the Spadra Shale. Many of the higher hills are capped with sandstone, and the soils on these hilltops are mainly those of the Mountainburg series.

Also in the southern part of the county is the Fort Smith Formation. It consists of alternate beds of sandstone and shale. The soils derived from this material are similar to those derived from the Spadra Shale, except for the Linker, Hartsells, and Mountainburg soils, which formed on the higher hilltops, predominantly in residuum from sandstone.

Soils on the flood plains and terraces along upland streams throughout the county are mainly of the Pickwick, Dubbs, and Cleora series. They differ generally in age and development, and locally in parent material. Pickwick soils are on the higher terraces and have strongly developed profiles. Dubbs soils are on low terraces and have weakly developed profiles. Cleora soils are on flood plains and have little or no horizon development.

Soils along the Arkansas River formed in poorly graded, well-sorted, alluvial sediments deposited by flood waters. The Bruno soils formed in sandy sediments deposited along or near the river. The McKamie, Iberia, Moreland, and Muldrow soils formed in the clayey sediments deposited by slack water or still water on flats and flood bays at points farther from the river. All of these soils have a fine-textured subsoil. The Caspiana and Morganfield soils formed in the silty sediments deposited between the areas of sandy sediments and clayey sediments.

Relief

The slope range in Franklin County is predominantly 1 to 60 percent, but there are level spots and nearly vertical bluffs.

Generally, the steeper slopes and narrow ridges have lost so much soil material through geologic erosion that the soils on them—Mountainburg and Montevallo soils, for example—are shallow. In contrast, the broad, level or gently sloping areas have lost little soil material, and the soils—Linker, Hartsells, Leadvale, and Ora, for example—are deep.

In the coves and on the foot slopes and mountain benches are deep accumulations of material that washed or slid down from adjoining steep slopes. The Allen and Holston soils occur in such spots. In places where rocks have broken off and rolled downslope, these soils are stony.

The prairies in the southern part of the county appear to be drained lakebeds. They are generally level and are surrounded by hills, or at least by a higher border. Surface drainage is slow or ponded, and the soils are poorly drained to somewhat poorly drained and slowly to very slowly permeable. They are gray or have gray mottles, because of the reduction of iron, and have a seasonal high, or perched, water table. Leaching of cations is not so advanced in some of these soils as in many of the well-drained soils on uplands and terraces. Falkner, Taft, Guthrie, and Wing soils occur on these depressional prairies.

The flood plains are level and are subject to frequent overflow. The floodwaters, loaded with soil particles, move at different speeds, depending partly on the topography. The rapidly moving waters deposit sand, in which the Bruno soils formed. The waters moving less rapidly deposit silt, in which the Morganfield and Caspiana soils formed. The slack or still waters caught in flood bays and broad flats deposit clayey sediments, in which the Moreland, Muldrow, and Iberia soils formed.

Time

The length of time required for the formation of soil depends largely upon the other factors of soil formation. Usually a long time is required for the formation of distinct horizons. Less time is generally required if the climate is warm and humid and the vegetation is luxuriant.

Most of the soils in this county are old, regardless of whether they are on mountaintops, mountainsides, or stream terraces. The young soils formed either in alluvium along streams or in residuum from bedrock where geologic erosion has nearly kept pace with weathering.

The Enders soils are examples of old soils. They show a high degree of development. The horizons are clearly expressed, there has been considerable weathering and translocation of clay, and a large proportion of the cations has been leached out. The reaction is strongly acid to extremely acid. Iron has been translocated from the surface layer to the subsoil and then oxidized, caus-

ing the subsoil to have stronger red, yellow, and brown colors than the surface layer.

The Dubbs soils are examples of soils of intermediate age. They formed in medium-textured alluvium on low stream terraces. They have a low degree of development. The horizons are weakly expressed, and there is little difference in color among the individual horizons. Some clay has been translocated and has formed thin, patchy films on ped surfaces. High base saturation and medium acid reaction show that the leaching of cations has been only moderate.

The Morganfield soils are examples of very young soils. They formed in recent alluvium on flood plains. No definite horizons have formed. Instead, these soils still have the depositional rock structure, that is, bedding planes, and little or no soil structure. Base saturation is high and the reaction is slightly acid to mildly alkaline, which indicates that leaching has been slight. The organic-matter content varies with increasing depth. Except for the slight mechanical changes caused by worms and roots, there is little evidence of soil-forming activity.

Processes of Soil Formation

Physical weathering of rocks, accumulation of organic matter, leaching of bases, reduction or oxidation and transfer of iron, and formation and translocation of silicate clay minerals have been the active processes in the formation of most soils in Franklin County.

Sunshine, rain, frost, and wind slowly break large rocks into small pieces. Wetting and drying, heating and cooling, freezing and thawing, all tend to weaken the rock structure. This process has been important in the formation of Linker, Mountainburg, and other soils in Franklin County.

Accumulation of organic matter in the surface layer of the soils has been an important process in horizon development. The A1 horizon is darker colored because organic matter has been added, and the A2 horizon is lighter colored because organic matter as well as clay minerals and iron oxides have been removed. This process has been important in the formation of Hartsells and Muskogee soils. The organic-matter content of the soils of this county is medium to low.

Leaching of bases has occurred in nearly all soils in the county. Generally this process precedes translocation of silicate clay materials. Cleora and Morganfield, young soils derived from stratified alluvium, are examples of soils that are not leached. In contrast, the Enders soil is an older soil that is very strongly acid, is leached of bases, and has undergone significant clay translocation.

Transfer and oxidation of iron are evident in the moderately well drained and well drained soils in the county. Iron has been moved from the surface layer to the subsoil. The oxidation of iron is indicated by the red and yellowish-brown colors in the subsoil. These processes have been important in the formation of Linker, Allen, Pickwick, and other soils.

Reduction and transfer of iron are evident in the poorly drained and somewhat poorly drained soils. Gray colors are evidence of the reduction of iron. Mottles of red, brown, and yellow in a grayish matrix in some horizons and iron concretions in other horizons indicate the segregation of iron. These processes have been important in the formation of Guthrie, Falkner, and Taft soils.

Translocation of clay minerals has contributed to horizon development in most of the soils in the county. The eluviated A2 horizon contains less clay and generally is lighter colored than the B horizon. The B horizon generally has an accumulation of clay in the form of clay films in pores and on ped surfaces. The C horizon contains less clay than the B horizon.

The leaching of bases and the translocation of clay minerals are among the more important processes in soil formation in this county. Probably the main reason for the difference in degree of clay translocation in soils is the difference in age. Pickwick, Dubbs, and Cleora soils, for example, are closely associated on the landscape. Pickwick soils are on the older, higher terraces, Dubbs soils are on the lower terraces, and Cleora soils are on the flood plains. Pickwick soils, the oldest of the three soils, have low base saturation and strongly developed horizons, and the peds and pores in the B horizon are well coated with clay films. Dubbs soils have high base saturation, weakly developed horizons with little variation in color and texture, and thin, patchy clay films on peds and in pores. Cleora soils, the youngest of the three soils, have high base saturation and little or no horizon development. Clay translocation is not evident, and clay coatings cannot be identified in the soil.

Classification of the Soils

Classification consists of an orderly grouping of soils according to a system designed to make it easier to remember soil characteristics and interrelationships. Classification is useful in organizing and applying the results of experience and research. Soils are placed in narrow classes for discussion in detailed soil surveys and for application of knowledge within farms and fields. The many thousands of narrow classes are then grouped into progressively fewer and broader classes in successively higher categories, so that information can be applied to large geographic areas.

Two systems of classifying soils have been used in the United States in recent years. The older system was adopted in 1938 (*2*) and revised later (*9*). The system currently used by the National Cooperative Soil Survey was adopted in 1965 (*14*). It is under continual study. Readers interested in the development of the system should refer to the latest literature available (*8*).

The current system of classification has six categories. Beginning with the most inclusive, these categories are the order, the suborder, the great group, the subgroup, the family, and the series. The criteria for classification are soil properties that are observable or measurable, but the properties are selected so that soils of similar genesis are grouped together. The placement of some soil series in the current system of classification, particularly in families, may change as more precise information becomes available.

Table 9 shows the classification of each soil series of Franklin County by family, subgroup, and order, according to the current system. It also shows one category—the great soil group—of the 1938 system.

TABLE 9.—*Soil series classified according to the current system of classification and the 1938 system*

Series	Current system			1938 system
	Family	Subgroup	Order	Great soil group
Allen	Fine-loamy, siliceous, thermic	Typic Paleudults	Ultisols	Red-Yellow Podzolic soils.
Bruno	Sandy, mixed, thermic	Typic Udifluvents	Entisols	Regosols grading to Alluvial soils.
Caspiana [1]	Fine-silty, mixed, thermic	Typic Argiudolls	Mollisols	Gray-Brown Podzolic soils.
Cleora	Coarse-loamy, mixed, thermic	Fluventic Hapludolls	Mollisols	Alluvial soils.
Dubbs	Fine-silty, mixed, thermic	Typic Hapludalfs	Alfisols	Gray-Brown Podzolic soils.
Enders	Clayey, mixed, thermic	Typic Hapludults	Ultisols	Red-Yellow Podzolic soils.
Falkner	Fine-silty, mixed, thermic	Aquultic Paleudalfs	Alfisols	Red-Yellow Podzolic soils.
Guthrie	Fine-silty, siliceous, thermic	Typic Fragiaquults	Ultisols	Planosols.
Hartsells [2]	Fine-loamy, siliceous, mesic	Typic Hapludults	Ultisols	Red-Yellow Podzolic soils.
Holston	Fine-loamy, siliceous, thermic	Typic Paleudults	Ultisols	Red-Yellow Podzolic soils.
Iberia	Fine, montmorillonitic, noncalcareous, thermic.	Vertic Haplaquolls	Mollisols	Humic Gley soils.
Iuka	Coarse-loamy, siliceous, acid, thermic.	Aquic Udifluvents	Entisols	Alluvial soils.
Leadvale	Fine-silty, siliceous, thermic	Typic Fragiudults	Ultisols	Red-Yellow Podzolic soils.
Linker	Fine-loamy, siliceous, thermic	Typic Hapludults	Ultisols	Red-Yellow Podzolic soils.
McKamie	Fine, mixed, thermic	Vertic Hapludalfs	Alfisols	Red-Yellow Podzolic soils.
Montevallo	Loamy-skeletal, mixed, thermic, shallow.	Typic Dystrochrepts	Inceptisols	Lithosols.
Moreland [3]	Fine, mixed, thermic	Vertic Haplustolls	Mollisols	Alluvial soils.
Morganfield	Coarse-silty, mixed, nonacid, thermic.	Typic Udifluvents	Entisols	Alluvial soils.
Mountainburg	Loamy-skeletal, siliceous, thermic	Lithic Hapludults	Ultisols	Lithosols.
Muldrow	Fine, mixed, noncalcareous, thermic.	Typic Argiaquolls	Mollisols	Humic Gley soils.
Muskogee	Fine-silty, mixed, thermic	Aquultic Paleudalfs	Alfisols	Gray-Brown Podzolic soils.
Ora	Fine-loamy, mixed, thermic	Typic Fragiudults	Ultisols	Red-Yellow Podzolic soils.
Pickwick	Fine-silty, mixed, thermic	Typic Paleudults	Ultisols	Red-Yellow Podzolic soils.
Taft	Fine-silty, siliceous, thermic	Aquiptic Fragiudults	Ultisols	Red-Yellow Podzolic soils.
Wing	Fine, mixed, thermic	Aquic Natrustalfs	Alfisols	Solodized-Solonetz soils.

[1] Limited laboratory data indicate the organic-matter content in the A and B1 horizons (if the B1 horizon is present) of the Caspiana soils in Franklin County is barely qualifying or marginal for a mollic epipedon. The solum of the pedon described is slightly thicker than is allowed in the Caspiana series.

[2] The Hartsells soils in Franklin County are in a thermic temperature zone, but proposal of a thermic equivalent was deemed inadvisable during correlation.

[3] Because of modifications in the current classification system before this survey was sent to the printer, the soils in Franklin County correlated as members of the Moreland series will be excluded from the series. New series placement has not been developed.

Following are brief descriptions of each of the categories in the current system.

Order.—Ten soil orders are recognized in the current system. They are Entisols, Vertisols, Inceptisols, Aridisols, Mollisols, Spodosols, Alfisols, Ultisols, Oxisols, and Histosols. The properties used to differentiate the soil orders are those that tend to give broad climatic groupings of soils. Three exceptions are Entisols, Inceptisols, and Histosols, which occur in many different climates.

Five of the soil orders are recognized in Franklin County. They are Entisols, Inceptisols, Mollisols, Alfisols, and Ultisols.

Entisols are mineral soils that formed either in recent alluvium or in older material consisting of almost pure quartz sand. They have little, if any, horizon development. This order includes many of the soils formerly classified as Alluvial soils and Regosols.

Inceptisols are mineral soils that formed in young but not recent material. They lack well-defined horizons. They have a slight accumulation of organic matter in the surface layer and weak, subangular blocky structure in the B2 horizon. This order includes many soils formerly classified as Brown Forest soils, Low-Humic Gley soils, Humic Gley soils, and Lithosols, and some that were classified as Alluvial soils.

Mollisols are mineral soils that have a thick, dark-colored surface layer dominated by bivalent cations, a moderate to strong structure, and a base saturation of more than 50 percent. This order includes most soils formerly classified as Chernozems, Brunizems (Prairie soils), Chestnut soils, Reddish Prairie soils, Humic Gley soils, and Planosols. It also includes the soils formerly classified as Rendzinas, Brown soils, Reddish Chestnut soils, and Brown Forest soils that have a dark-colored surface layer.

Alfisols have a light-colored surface layer, a clay-enriched B horizon, an accumulation of aluminum and iron, and a base saturation of more than 35 percent. This order includes most of the soils formerly classified as Gray-Brown Podzolic soils, Gray Wooded soils, Noncalcic Brown soils, Degraded Chernozems, Planosols, and Half Bog soils.

Ultisols are mineral soils that have a horizon of clay accumulation and a base saturation lower than 35 percent. This order includes most of the soils formerly classified as Red-Yellow Podzolic soils, Reddish-Brown Lateritic soils, Planosols, and Half Bog soils.

Suborder.—Each order is divided into suborders, primarily on the basis of soil characteristics that produce classes having genetic similarity. A suborder has a narrower climatic range than an order. The criteria for suborders reflect either the presence or absence of water-logging or differences in climate or vegetation.

Great Group.—Each suborder is divided into great groups on the basis of uniformity in the kind and sequence of genetic horizons.

Subgroup.—Each great group is divided into subgroups, one representing the central (typic) segment of the group, and others, called intergrades, made up of soils that have mostly properties of one great group but also one or more properties of another great group.

Family.—Families are established within each subgroup, primarily on the basis of properties important to plant growth. Some of these properties are texture, mineralogy, reaction, soil temperature, permeability, consistence, and thickness of horizons.

Series.—The series has the narrowest range of characteristics of the categories in the classification system. It is explained in the section "How This Survey Was Made."

A detailed description of each soil series in the county is given in the section "Descriptions of the Soils."

Particle-Size Distribution and Chemical Analysis

The physical and chemical properties of selected soils representing 18 series in Franklin County are shown in tables 10 and 11. The samples were analyzed at the University of Arkansas in Fayetteville. Except for Enders, McKamie, and Pickwick soils, the data reported in tables 10 and 11 are for the profiles described in the section "Descriptions of the Soils." Data for Enders, McKamie, and Pickwick soils are for profiles morphologically similar to those described.

Particle-size distribution was determined by the hydrometer method (*5*), using Calgon and stirring with a motor mixer for dispersion. Sands were fractionated by sieving. The textures given in the section "Descriptions of the Soils" are field estimates and do not necessarily agree with those in the last column of table 10.

The organic carbon content was determined by the Walkley-Black method, digesting with potassium dichromate-sulphuric acid (*6*). The percentage of organic matter was calculated by the equation: Percent carbon $\times$ 1.724 = organic matter.

Soil pH was determined on mixtures of soil and water at a ratio of 1 : 1, using a Beckman pH meter.

Available phosphorus was extracted by the Bray No. 1 solution (0.03N NH4F in 0.025 N HCL) and was determined colorimetrically.

Potassium, calcium, magnesium, and sodium were extracted with 1N ammonium acetate buffered at pH 7.0 with ammonium hydroxide (*6*). Potassium, calcium, and sodium in the extract were determined with a flame emission spectrophotometer. Magnesium in the extract was determined colorimetrically, by visual means, after the color was developed by adding hydroxylamine chloride, gum arabic, Clayton yellow, and sodium hydroxide.

Extractable hydrogen was determined by reaction of the soil with a buffer solution of barium chloride and triethanolamine. The leachate was then titrated with hydrochloric acid (*3*).

The total of extractable calcium, hydrogen, potassium, magnesium, and sodium is an approximation of the cation exchange capacity of the soil. The base saturation percentage was determined by dividing the total of calcium, potassium, magnesium, and sodium by the total of extractable cations and multiplying by 100.

General Nature of the County

The soils of Franklin County are underlain by alternate beds of acid sandstone and shale. Most of the strata are horizontally bedded. In the extreme southern part of the county, some are inclined. All the rocks are sedimentary in origin. Coal strata occur near Charleston and Alix.

The Boston Mountains, which make up the northern third of the county, are remnants of an old, deeply incised plateau. They are capped by sandstone. The mountainsides are interbedded sandstone and shale. Sandstone benches are prominent features. There are several small outcrops of limestone in the area. The gradient is 3 to 65 percent. The elevation ranges from about 800 feet in the stream valleys to more than 2,400 feet on the mountaintops.

The Arkansas valley, which makes up most of the rest of the county, consists of rolling and flat-top hills and long narrow ridges. The hilltops and ridges are hard resistant sandstone. The hillsides and valleys are mostly underlain by shale. The gradient is 1 to 45 percent. The elevation ranges from 400 to about 1,200 feet.

The bottom land, an alluvial strip ¼ mile to 3 miles wide bordering the Arkansas River, extends across the county from east to west. The gradient is 0 to 5 percent. The elevation is 350 to 400 feet.

The Arkansas and Mulberry Rivers and White Oak, Hurricane, Mill, Smith, and Sixmile Creeks are the principal streams in the county. Most of the streams in the Boston Mountains are deeply entrenched. Those in the Arkansas valley north of the Arkansas River have formed moderately wide flood plains. Those south of the river have not formed extensive flood plains. The Arkansas River receives all but a small part of the drainage in the county. A small area in the northern part of the county drains north into the White River.

Climate [7]

Table 12, p. 91, shows, by months, the average daily maximum temperature, average daily minimum temperature, and average precipitation for Franklin County.

Temperature.—Temperatures vary significantly between the rugged terrain in the northern part of the county and the rolling to hilly terrain in the southern part, and they are 2 or 3 degrees higher in Franklin County than in counties to the north, on the Ozark

[7] R. O. REINHOLD, chief, U.S. Weather Bureau, Little Rock, Ark., helped prepare this section.

TABLE 10—*Particle-size distribution in selected soils*

[Analyzed by Soils Laboratory, University of Arkansas, Fayetteville, Ark.]

Soil and sample number	Horizon	Depth	Particle-size distribution							
			Very coarse sand (2 to 1 mm.)	Coarse sand (1 to 0.5 mm.)	Medium sand (0.5 to 0.25 mm.)	Fine sand (0.25 to 0.1 mm.)	Very fine sand (0.1 to 0.05 mm.)	Total sand	Silt (0.05 to 0.002 mm.)	Cla (le tha 0.0 mm
Dubbs fine sandy loam:		*In.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pc*
S–64–Ark–24–8–(1)	Ap1	0–3	0.1	0.6	2.0	19.6	19.5	41.8	49.2	9
S–64–Ark–24–8–(2)	Ap2	3–7	0	.1	.7	11.8	20.4	33.0	49.3	17
S–64–Ark–24–8–(3)	B21t	7–27	0	.2	.9	11.4	18.4	30.9	48.2	20
S–64–Ark–24–8–(4)	B22t	27–37	0	.3	1.8	17.6	24.8	44.5	36.1	19
S–64–Ark–24–8–(5)	B3	37–44	0	.6	5.0	27.6	19.7	52.9	33.0	14
Enders gravelly silt loam:										
S–65–Ark–24–25–(1)	Ap	0–4	0	1.5	1.0	10.4	5.1	18.0	65.7	16
S–65–Ark–24–25–(2)	B1	4–8	0.1	2.1	1.1	8.2	9.1	20.6	48.4	31
S–65–Ark–24–25–(3)	B21t	8–18	0	.5	.5	2.6	2.7	6.3	24.2	69
S–65–Ark–24–25–(4)	B22t	18–36	0	.2	.4	.7	1.0	2.3	19.4	78
S–65–Ark–24–25–(5)	C	36–64	0	.3	.3	.5	.6	1.7	28.8	69
S–65–Ark–24–25–(6)	R	64–72	0	1.3	1.0	1.6	1.5	5.4	50.4	44
Guthrie silt loam:										
S–65–Ark–24–16–(1)	Ap1	0–3	0	.4	.5	5.3	11.8	18.0	70.2	11
S–65–Ark–24–16–(2)	Ap2	3–7	0	.3	.6	6.8	8.6	16.3	67.7	16
S–65–Ark–24–16–(3)	B1g	7–11	0	1.0	1.1	5.7	10.3	18.1	64.5	17
S–65–Ark–24–16–(4)	B2tg	11–17	0	.5	.8	2.4	3.4	7.1	66.1	26
S–65–Ark–24–16–(5)	Bx1g	17–32	0	.2	.2	1.5	3.7	5.6	69.3	25
S–65–Ark–24–16–(6)	Bx2g	32–52	0	.6	.7	2.7	3.7	7.7	59.1	33
S–65–Ark–24–16–(7)	IICg	52–72	0	1.6	2.7	3.3	3.5	11.1	44.2	44
Hartsells fine sandy loam:										
S–65–Ark–24–2–(1)	A1	0–2	0	.8	.8	39.9	13.6	55.1	41.1	3
S–65–Ark–24–2–(2)	A2	2–5	0	.4	.6	42.0	13.4	56.4	38.1	5
S–65–Ark–24–2–(3)	B21t	5–12	0	.3	.4	31.5	11.9	44.1	39.8	16
S–65–Ark–24–2–(4)	B22t	12–18	0	.1	.3	28.1	8.2	36.7	36.5	26
S–65–Ark–24–2–(5)	B23t	18–26	0	.1	.2	36.0	9.7	46.0	27.2	26
Holston gravelly loam:										
S–65–Ark–24–4–(1)	A11	0–2	0	3.8	2.9	8.4	5.6	20.7	65.5	13
S–65–Ark–24–4–(2)	A12	2–8	0	5.3	3.6	7.9	5.4	22.2	65.5	12
S–65–Ark–24–4–(3)	B1	8–11	0	.3	3.5	11.3	6.4	21.5	56.9	21
S–65–Ark–24–4–(4)	B21t	11–17	0	2.6	.9	10.2	6.3	20.0	55.2	24
S–65–Ark–24–4–(5)	B22t	17–39	0	2.6	3.7	11.1	6.1	23.5	48.5	28
S–65–Ark–24–4–(6)	B23t	39–48	0	1.8	3.5	11.8	6.4	23.5	47.1	29
S–65–Ark–24–4–(7)	B24t	48–75	0	2.0	2.2	7.0	5.1	16.3	48.8	34
Iberia clay:										
S–65–Ark–24–15–(1)	Ap	0–6	0	.3	.2	.4	.9	1.8	39.5	58
S–65–Ark–24–15–(2)	ACg	6–20	0	.2	.2	.6	.4	1.4	41.4	57
S–65–Ark–24–15–(3)	C1g	20–47	0	.1	.1	.4	2.0	2.6	37.4	60
S–65–Ark–24–15–(4)	C2	47–72	0	.2	.2	.5	.6	1.5	30.3	68

Leadvale silt loam:										
S–65–Ark–24–13–(1)	Ap	0–8	0	1.8	.9	6.1	13.5	22.3	73.9	3
S–65–Ark–24–13–(2)	B21t	8–14	0	.5	.4	3.0	9.0	12.9	65.4	21
S–65–Ark–24–13–(3)	B22t	14–22	0	.6	.4	3.0	8.3	12.3	63.5	24
S–65–Ark–24–13–(4)	Bx1	22–34	0	.2	.2	2.1	4.9	7.4	62.0	30
S–65–Ark–24–13–(5)	Bx2	34–72	0	.1	.3	2.7	5.7	8.8	56.6	34
Linker fine sandy loam:										
S–64–Ark–24–2–(1)	Ap	0–5	.1	.4	.9	38.4	25.1	64.9	31.4	3
S–64–Ark–24–2–(2)	B1	5–8	0	.3	.7	29.6	18.9	49.5	35.5	15
S–64–Ark–24–2–(3)	B21t	8–14	0	.3	.7	23.0	13.7	37.7	33.1	29
S–64–Ark–24–2–(4)	B22t	14–23	0	.2	.4	22.4	14.0	37.0	30.8	32
S–64–Ark–24–2–(5)	B23t	23–31	0	.1	.6	26.4	15.4	42.5	25.7	31
McKamie silt loam:										
S–66–Ark–24–2–(1)	Ap	0–3	.1	5.0	2.4	6.7	14.4	28.6	67.4	4
S–66–Ark–24–2–(2)	B21t	3–12	0	.1	.3	6.7	7.4	14.5	34.9	50
S–66–Ark–24–2–(3)	B22t	12–18	0	.2	.2	8.1	12.6	21.1	33.6	45
S–66–Ark–24–2–(4)	B23t	18–26	0	.2	.4	13.7	9.1	23.4	24.2	52
S–66–Ark–24–2–(5)	B24t	26–43	.1	2.2	2.3	16.0	9.4	30.0	33.7	36
S–66–Ark–24–2–(6)	B3	43–52	0	1.8	2.9	19.5	10.1	34.3	41.9	23
S–66–Ark–24–2–(7)	C1	52–62	0	.1	.9	42.3	18.3	61.6	27.8	10
Montevallo gravelly silt loam: [1]										
S–64–Ark–24–9–(1)	Ap	0–4	.8	1.9	1.3	3.4	8.3	15.7	61.2	23
S–64–Ark–24–9–(2)	A2	4–7	1.0	1.9	1.4	4.1	7.8	16.2	56.7	27
S–64–Ark–24–9–(3)	B	7–11	.8	1.8	.8	2.6	5.9	11.9	44.4	43
S–64–Ark–24–9–(4)	R	11–20	2.0	5.7	3.2	5.5	7.2	23.6	53.2	23
Moreland silty clay loam:										
S–65–Ark–24–24–(1)	Ap	0–6	0	.3	.4	1.5	3.9	6.1	68.7	25
S–65–Ark–24–24–(2)	A11	6–13	0	.2	.5	1.6	2.7	5.0	60.1	34
S–65–Ark–24–24–(3)	A12	13–27	0	0	.3	1.4	2.8	4.5	57.0	38
S–65–Ark–24–24–(4)	B	27–50	0	0	.1	.6	1.8	2.5	55.2	42
S–65–Ark–24–24–(5)	C	50–72	0	0	.3	2.7	3.3	6.3	64.2	29
Morganfield very fine sandy loam:										
S–65–Ark–24–21–(1)	Ap	0–8	0	.1	.2	8.0	48.7	57.0	40.3	2
S–65–Ark–24–21–(2)	A1	8–18	0	0	.1	3.2	55.3	58.6	38.7	2
S–65–Ark–24–21–(3)	C1	18–24	0	.1	.1	2.2	47.8	50.2	42.5	7
S–65–Ark–24–21–(4)	C2	24–35	0	0	.1	6.4	39.6	46.1	46.4	7
S–65–Ark–24–21–(5)	C3	35–57	0	0	.2	10.1	20.9	31.2	54.4	14
S–65–Ark–24–21–(6)	C4	57–72	0	0	.2	13.1	18.9	32.2	55.2	12
Mountainburg gravelly fine sandy loam: [1]										
S–65–Ark–24–26–(1)	Ap	0–3	0	.6	1.2	29.9	28.6	60.3	36.0	3
S–65–Ark–24–26–(2)	B1	3–6	0	.5	1.2	33.8	24.9	60.4	32.8	6
S–65–Ark–24–26–(3)	B21t	6–11	0	.3	.8	32.3	20.1	53.5	35.1	11
S–65–Ark–24–26–(4)	B22t	11–18	0	.4	1.2	34.3	24.2	60.1	31.1	8
Muldrow silt loam:										
S–65–Ark–24–23–(1)	Ap	0–4	0	.4	.5	2.5	5.5	8.9	71.5	19
S–65–Ark–24–23–(2)	A1	4–10	0	.5	.6	2.7	5.4	9.2	70.8	20
S–65–Ark–24–23–(3)	ABg	10–17	0	1.7	.4	3.9	6.3	12.3	56.9	30
S–65–Ark–24–23–(4)	Btg	17–41	0	.4	.4	1.3	4.5	6.6	48.1	45
S–65–Ark–24–23–(5)	Cg	41–72	0	.9	.8	3.1	7.6	12.4	53.1	34

TABLE 10.—*Particle-size distribution in selected soils*—Continued

Soil and sample number	Horizon	Depth	Particle-size distribution							Cl (le tha 0.0 mm
			Very coarse sand (2 to 1 mm.)	Coarse sand (1 to 0.5 mm.)	Medium sand (0.5 to 0.25 mm.)	Fine sand (0.25 to 0.1 mm.)	Very fine sand (0.1 to 0.05 mm.)	Total sand	Silt (0.05 to 0.002 mm.)	
Ora fine sandy loam:		*In.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pct.*	*Pc*
S–64–Ark–24–10–(1)	Ap1	0–2	1. 4	1. 9	3. 1	12. 7	25. 7	44. 8	44. 1	1
S–64–Ark–24–10–(2)	Ap2	2–5	1. 3	2. 1	4. 1	14. 4	24. 7	46. 6	40. 9	1
S–64–Ark–24–10–(3)	B1t	5–10	. 3	1. 4	3. 5	12. 3	26. 6	44. 1	38. 1	1
S–64–Ark–24–10–(4)	B21t	10–13	. 6	1. 4	3. 4	11. 7	21. 8	38. 9	36. 1	2
S–64–Ark–24–10–(5)	B22t	13–23	. 4	1. 3	3. 1	9. 5	21. 1	35. 4	35. 9	2
S–64–Ark–24–10–(6)	Bx1	23–39	. 6	1. 3	3. 3	11. 1	19. 8	36. 1	35. 2	2
S–64–Ark–24–10–(7)	Bx2	39–60	. 2	1. 5	3. 5	9. 8	18. 3	33. 3	40. 6	2
Pickwick silt loam:										
S–65–Ark–24–8–(1)	Ap	0–6	0	1. 4	1. 8	11. 7	16. 2	31. 1	66. 4	
S–65–Ark–24–8–(2)	B1	6–11	0	. 9	1. 3	7. 6	11. 8	21. 6	57. 3	2
S–65–Ark–24–8–(3)	B21t	11–17	0	. 8	1. 0	7. 4	10. 7	19. 9	53. 5	2
S–65–Ark–24–8–(4)	B22t	17–30	0	. 8	. 8	6. 2	8. 8	16. 6	49. 9	3
S–65–Ark–24–8–(5)	B23t	30–47	0	. 8	. 8	6. 0	8. 0	15. 6	54. 8	2
S–65–Ark–24–8–(6)	B3	47–72	0	. 7	. 9	6. 6	8. 1	16. 2	57. 1	2
Taft silt loam:										
S–65–Ark–24–28–(1)	Ap	0–5	0	1. 2	. 6	. 9	2. 2	4. 9	81. 0	1
S–65–Ark–24–28–(2)	B1	5–10	0	1. 4	. 5	. 5	3. 5	5. 9	77. 5	1
S–65–Ark–24–28–(3)	B2	10–15	0	1. 0	. 4	. 7	3. 4	5. 5	73. 8	2
S–65–Ark–24–28–(4)	Bx1	15–22	0	1. 3	. 5	. 8	3. 3	5. 9	68. 2	2
S–65–Ark–24–28–(5)	Bx2	22–44	0	. 2	. 2	. 8	2. 8	4. 0	54. 7	4
S–65–Ark–24–28–(6)	Bx3	44–58	0	. 3	. 4	1. 5	1. 9	4. 1	54. 7	4
Wing silt loam:										
S–65–Ark–24–19–(1)	Ap	0–4	0	2. 5	1. 3	3. 1	2. 9	9. 8	77. 6	1
S–65–Ark–24–19–(2)	A1	4–8	0	1. 0	. 9	2. 7	4. 5	9. 1	78. 5	1
S–65–Ark–24–19–(3)	B1	8–16	0	2. 9	1. 5	4. 3	5. 1	13. 8	62. 7	2
S–65–Ark–24–19–(4)	B21t	16–22	0	. 2	. 2	1. 7	4. 6	6. 7	50. 6	4
S–65–Ark–24–19–(5)	B22t	22–30	0	. 7	1. 0	2. 3	2. 0	6. 0	43. 0	5
S–65–Ark–24–19–(6)	B3	30–72	0	1. 3	1. 2	3. 6	3. 8	9. 9	48. 6	4

[1] Fragments coarser than 2 millimeters were discarded.

TABLE 11.—*Chemical analysis of selected soils*

[Analyzed by Soils Laboratory, University of Arkansas, Fayetteville, Ark.]

Soil and sample number	Horizon	Extractable cations (milliequivalents per 100 grams of soil)						Base saturation	Reaction (soil-water ratio of 1:1)	Organic matter	Available phosphorus
		Potassium	Calcium	Magnesium	Sodium	Hydrogen	Total				
								Pct.	*pH*	*Pct.*	*Lb./acre*
Dubbs fine sandy loam:											
S-64-Ark-24-8-(1)	Ap1	0.2	4.3	1.0	0.1	6.4	12.0	47	6.2	1.9	7
S-64-Ark-24-8-(2)	Ap2	.1	5.5	1.0	.1	5.9	12.6	53	6.2	.9	5
S-64-Ark-24-8-(3)	B21t	.1	5.8	1.0	.2	6.6	13.7	52	6.3	.7	6
S-24-Ark-24-8-(4)	B22t	.1	4.1	1.0	.2	6.8	12.2	44	6.0	.4	7
S-64-Ark-24-8-(5)	B3	.1	3.1	1.0	.1	5.2	9.5	45	6.0	.3	13
Enders gravelly silt loam:											
S-65-Ark-24-25-(1)	Ap	.3	3.3	1.3	.1	8.5	13.5	37	5.4	3.4	13
S-65-Ark-24-25-(2)	B1	.2	1.1	1.0	.2	8.7	11.2	22	5.4	.5	14
S-65-Ark-24-25-(3)	B21t	.2	.4	1.9	.1	19.7	22.3	12	4.7	.3	3
S-65-Ark-24-25-(4)	B22t	.2	.4	1.4	.2	23.0	25.2	9	5.0	.2	7
S-65-Ark-24-25-(5)	C	.5	.3	2.9	.5	18.1	22.3	19	5.5	.1	32
S-65-Ark-24-25-(6)	R	.6	.3	2.9	.6	18.9	23.3	19	5.7	.2	21
Guthrie silt loam:											
S-65-Ark-24-16-(1)	Ap1	.2	3.6	.8	.3	6.8	11.7	42	5.8	3.2	8
S-65-Ark-24-16-(2)	Ap2	.2	2.3	.7	.3	6.5	10.0	35	5.3	2.0	6
S-65-Ark-24-16-(3)	B1g	.2	1.3	.7	.2	7.3	9.7	25	5.0	1.4	5
S-65-Ark-24-16-(4)	B2tg	.1	1.1	.7	.2	10.3	12.4	17	4.8	1.4	10
S-65-Ark-24-16-(5)	Bx1g	.1	.8	.6	.2	7.3	9.0	9	4.9	.6	14
S-65-Ark-24-16-(6)	Bx2g	.1	.6	.9	.4	8.2	10.2	20	5.0	.4	15
S-65-Ark-24-16-(7)	IICg	.2	.9	3.3	.8	10.0	15.2	34	5.5	.4	15
Hartsells fine sandy loam:											
S-65-Ark-24-2-(1)	A1	.2	.9	.3	.1	9.0	10.5	14	5.0	2.3	10
S-65-Ark-24-2-(2)	A2	.1	.8	.3	.1	4.8	6.1	21	5.3	1.6	8
S-65-Ark-24-2-(3)	B21t	.1	.6	.3	.1	8.8	9.9	11	4.8	.9	20
S-65-Ark-24-2-(4)	B22t	.1	.4	.2	.1	12.0	12.8	6	4.6	.4	21
S-65-Ark-24-2-(5)	B23t	.1	.3	.2	.1	12.0	12.7	6	4.6	.4	18
Holston gravelly loam:											
S-65-Ark-24-4-(1)	A11	.3	6.4	1.5	.3	12.9	21.4	40	6.0	4.0	16
S-65-Ark-24-4-(2)	A12	.2	4.1	1.5	.2	11.8	17.8	34	5.8	3.4	6
S-65-Ark-24-4-(3)	B1	.1	2.9	.9	.2	9.1	13.2	31	5.7	1.8	10
S-65-Ark-24-4-(4)	B21t	.1	2.1	.8	.2	9.4	12.6	25	5.4	.9	5
S-65-Ark-24-4-(5)	B22t	.2	1.9	1.4	.2	8.0	11.7	32	5.3	.5	11
S-65-Ark-24-4-(6)	B23t	.2	.9	1.0	.2	9.8	12.1	19	5.3	.3	10
S-65-Ark-24-4-(7)	B24t	.2	.5	1.4	.2	11.0	13.3	17	4.9	.2	4
Iberia clay:											
S-65-Ark-24-15-(1)	Ap	.8	10.8	6.3	.2	9.6	27.7	65	5.8	3.2	67
S-65-Ark-24-15-(2)	ACg	.1	12.4	7.4	.3	4.0	24.2	83	6.5	1.1	24
S-65-Ark-24-15-(3)	C1g	.1	12.5	6.7	.4	3.0	22.7	87	6.6	.8	20
S-65-Ark-24-15-(4)	C2	.4	14.5	7.5	.6	2.5	25.5	91	6.9	.6	32
Leadvale silt loam:											
S-65-Ark-24-13-(1)	Ap	.1	1.6	.4	.1	2.1	4.3	51	6.1	.5	14
S-65-Ark-24-13-(2)	B21t	.1	2.8	.6	.1	3.1	6.7	54	6.6	.3	10
S-65-Ark-24-13-(3)	B22t	.1	1.8	.8	.2	5.4	8.3	35	5.6	.2	13
S-65-Ark-24-13-(4)	Bx1	.1	.4	.9	.3	8.7	10.4	16	5.5	.1	12
S-65-Ark-24-13-(5)	Bx2	.1	.4	1.0	.4	10.9	12.8	15	5.7	.1	11
Linker fine sandy loam:											
S-64-Ark-24-2-(1)	Ap	.1	.6	.2	.1	3.0	4.0	25	5.5	1.0	7
S-64-Ark-24-2-(2)	B1	.1	1.0	.3	.1	4.6	6.1	25	5.5	.3	11
S-64-Ark-24-2-(3)	B21t	.2	1.2	.8	.1	8.9	11.2	21	5.3	.3	8
S-64-Ark-24-2-(4)	B22t	.2	.8	.9	.2	10.9	13.0	16	5.1	.2	6
S-64-Ark-24-2-(5)	B23t	.1	.4	.3	.1	10.4	11.3	8	5.0	.2	11
McKamie silt loam:											
S-66-Ark-24-2-(1)	Ap	.1	3.4	.7	.8	1.9	6.9	72	6.6	.9	53
S-66-Ark-24-2-(2)	B21t	0	5.9	.3	.2	10.3	16.7	38	5.6	.6	12
S-66-Ark-24-2-(3)	B22t	0	4.6	.5	.2	9.2	14.5	37	5.5	.4	5
S-66-Ark-24-2-(4)	B23t	0	3.4	.3	.3	10.2	14.2	28	5.3	.6	13
S-66-Ark-24-2-(5)	B24t	0	2.5	.3	.3	11.3	14.4	22	5.2	.4	9
S-66-Ark-24-2-(6)	B3	0	3.3	.4	.7	5.9	10.3	43	5.4	.2	8
S-66-Ark-24-2-(7)	C1	0	2.4	.3	.8	3.3	6.8	51	5.3	.2	4

TABLE 11.—*Chemical analysis of selected soils*—Continued

Soil and sample number	Horizon	Extractable cations (milliequivalents per 100 grams of soil)						Base saturation	Reaction (soil-water ratio of 1:1)	Organic matter	Available phosphorus
		Potassium	Calcium	Magnesium	Sodium	Hydrogen	Total				
								Pct.	*pH*	*Pct.*	*Lb./acre*
Montevallo gravelly silt loam:											
S-64-Ark-24-9-(1)	Ap	1.1	2.3	.9	.1	10.0	14.4	31	5.3	1.8	15
S-64-Ark-24-9-(2)	A2	.4	1.3	.9	.1	11.2	13.9	19	5.1	0	15
S-64-Ark-24-9-(3)	B	.4	.5	.7	.1	14.4	16.1	11	4.9	.6	34
S-64-Ark-24-9-(4)	R	.5	.2	.7	.2	13.3	14.9	11	5.3	.3	18
Moreland silty clay loam:											
S-65-Ark-24-24-(1)	Ap	.5	10.0	1.5	.2	2.6	14.8	82	6.1	1.7	35
S-65-Ark-24-24-(2)	A11	.4	9.5	1.9	.2	4.1	16.1	75	6.2	1.2	17
S-65-Ark-24-24-(3)	A12	.5	9.4	3.1	.2	4.5	17.7	75	6.2	1.2	14
S-65-Ark-24-24-(4)	B	.6	8.5	5.0	.3	5.1	19.5	74	6.1	.8	17
S-65-Ark-24-24-(5)	C	.5	5.8	4.7	.2	3.4	14.6	77	6.1	.3	35
Morganfield very fine sandy loam:											
S-65-Ark-24-21-(1)	Ap	.2	1.8	.4	.2	1.4	4.0	65	5.5	.5	51
S-65-Ark-24-21-(2)	A1	.2	2.9	.4	.2	.7	4.4	84	6.5	.3	58
S-65-Ark-24-21-(3)	C1	.2	3.9	.8	.2	1.2	6.3	81	6.4	.4	63
S-65-Ark-24-21-(4)	C2	.2	4.9	.9	.2	.8	7.0	89	6.9	.5	62
S-65-Ark-24-21-(5)	C3	.2	7.5	.5	.2	1.4	9.8	86	7.2	.9	58
S-65-Ark-24-21-(6)	C4	.2	6.8	.3	.2	1.0	8.5	88	6.6	.5	53
Mountainburg gravelly fine sandy loam:											
S-65-Ark-24-26-(1)	Ap	.3	1.8	.6	.1	3.4	6.3	45	6.0	1.9	18
S-65-Ark-24-26-(2)	B1	.2	1.0	.2	.1	3.4	4.9	31	5.4	.8	4
S-65-Ark-24-26-(3)	B21t	.1	.8	.2	.1	3.9	5.1	24	5.2	.6	4
S-65-Ark-24-26-(4)	B22t	.1	.6	.2	.1	3.6	4.7	23	5.3	.5	16
Muldrow silt loam:											
S-65-Ark-24-23-(1)	Ap	.2	5.2	1.5	.2	4.9	12.0	59	6.1	1.5	22
S-65-Ark-24-23-(2)	A1	.2	5.0	2.1	.2	4.4	11.9	63	6.1	1.5	11
S-65-Ark-24-23-(3)	ABg	.2	6.1	2.5	.3	7.1	16.2	56	5.6	.6	7
S-65-Ark-24-23-(4)	Btg	.5	8.9	5.0	.5	8.3	23.2	64	5.7	.6	17
S-65-Ark-24-23-(5)	Cg	.4	8.1	5.0	.6	3.9	18.0	78	6.5	.3	22
Ora fine sandy loam:											
S-64-Ark-24-10-(1)	Ap1	.1	.4	.2	.1	6.8	7.6	11	4.5	2.3	13
S-64-Ark-24-10-(2)	Ap2	.1	.3	.1	.1	6.6	7.2	8	4.5	1.6	18
S-64-Ark-24-10-(3)	B1t	.1	.3	.2	.1	5.9	6.6	11	4.9	1.3	17
S-64-Ark-24-10-(4)	B21t	.1	.3	.3	.2	6.7	7.6	12	5.1	.5	13
S-64-Ark-24-10-(5)	B22t	.1	.3	.2	.2	8.3	9.1	9	5.0	0	10
S-64-Ark-24-10-(6)	Bx1	.1	.2	.1	.2	7.9	8.5	7	5.0	0	6
S-64-Ark-24-10-(7)	Bx2	.1	.2	.1	.2	7.8	8.4	7	5.0	0	5
Pickwick silt loam:											
S-65-Ark-24-8-(1)	Ap	.1	1.0	.3	.1	2.1	3.6	42	5.4	.8	10
S-65-Ark-24-8-(2)	B1	.1	2.4	.7	.1	2.8	6.1	54	6.0	.3	6
S-65-Ark-24-8-(3)	B21t	.2	2.5	1.0	.1	3.6	7.4	51	6.2	.3	8
S-65-Ark-24-8-(4)	B22t	.2	.6	.8	.1	8.2	9.9	17	5.3	.2	12
S-65-Ark-24-8-(5)	B23t	.2	.6	.7	.1	7.9	9.5	17	5.3	.1	7
S-65-Ark-24-8-(6)	B3	.2	.3	.3	.1	6.0	6.9	13	5.0	.2	4
Taft silt loam:											
S-65-Ark-24-28-(1)	Ap	.1	.8	.5	.2	9.9	11.5	14	4.9	2.6	14
S-65-Ark-24-28-(2)	B1	.1	.4	.1	.2	9.8	10.6	8	4.8	1.8	13
S-65-Ark-24-28-(3)	B2	.1	.4	.1	.3	8.3	9.2	10	5.0	.5	11
S-65-Ark-24-28-(4)	Bx1	.1	.4	.2	.3	8.7	9.7	10	5.4	.6	16
S-65-Ark-24-28-(5)	Bx2	.2	.5	.7	.4	13.4	15.2	12	5.5	.6	13
S-65-Ark-24-28-(6)	Bx3	.2	1.0	1.5	.8	11.5	15.0	23	5.3	.1	12
Wing silt loam:											
S-65-Ark-24-19-(1)	Ap	.1	1.4	.6	1.4	3.7	7.2	49	6.8	1.1	4
S-65-Ark-24-19-(2)	A1	.1	1.4	.9	.5	4.3	7.2	40	6.1	1.9	7
S-65-Ark-24-19-(3)	B1	.1	.9	2.6	7.1	1.0	11.7	85	7.6	.5	6
S-65-Ark-24-19-(4)	B21t	.2	1.3	3.0	9.7	.3	14.5	98	8.7	.3	25
S-65-Ark-24-19-(5)	B22t	.2	5.3	3.3	13.3	0	22.1	100	9.4	.3	47
S-65-Ark-24-19-(6)	B3	.2	5.0	3.1	8.7	0	17.0	100	9.1	.1	13

TABLE 12.—*Temperature and precipitation*

[All data from Ozark, elevation 400 feet, for the period 1931 through 1960]

Month	Temperature				Precipitation		
	Average daily maximum	Average daily minimum	Two years in 10 will have at least 4 days with—		Average total	One year in 10 will have—	
			Maximum temperature equal to or higher than—	Minimum temperature equal to or lower than—		Less than—	More than—
	° *F.*	° *F.*	° *F.*	° *F.*	*Inches*	*Inches*	*Inches*
January	50. 7	28. 6	76	6	3. 41	0. 72	7. 44
February	56. 0	33. 0	79	12	3. 94	1. 01	8. 07
March	63. 1	38. 7	83	19	3. 84	1. 38	8. 24
April	74. 3	49. 9	91	28	4. 76	1. 91	7. 89
May	81. 0	58. 0	94	38	5. 68	2. 91	10. 10
June	88. 9	66. 1	100	50	4. 14	. 86	8. 89
July	93. 5	69. 5	105	58	3. 34	1. 27	5. 54
August	93. 6	68. 6	106	56	3. 10	. 69	5. 98
September	87. 1	61. 2	102	44	3. 29	. 35	7. 39
October	77. 2	50. 5	94	28	3. 31	. 71	6. 32
November	62. 9	38. 4	81	16	3. 29	. 56	7. 06
December	53. 0	31. 5	75	9	3. 04	. 87	5. 24
Year	73. 5	49. 5			45. 14	34. 55	59. 48

Plateau. The ridges of the Boston Mountains, in the northern part of Franklin County, provide a barrier against the penetration of cold air from the north in winter and a lift to the flow of moist air from the south, and the Arkansas River valley traps warm air in summer. In the mountains the elevation ranges up to 2,400 feet. In the valley it is between 350 and 400 feet, and in the southern part of the county, between 500 and 800 feet.

Maximum temperatures of 90° F. or higher have been recorded on an average of 80 days each year in the city of Ozark. An all-time high of 120° was recorded in August, 1936. Similar high temperatures have been recorded on 15 to 20 fewer days each year in the northern part of the county. Minimum temperatures of 32° or lower are recorded on an average of 70 days each year.

Records from the U.S. Weather Bureau Station at Ozark show that the average length of the growing season is 213 days. The average date of the last freezing temperature (32° F.) in spring is April 2, and the average date of the first in fall is November 1. The latest date that a temperature of 32° has been recorded is April 22 (in 1931), and the earliest is September 27 (in 1942). The average date of the last 28° reading in spring is March 22, and that of the first in fall is November 9. The latest date that a temperature of 28° has been recorded is April 13 (in 1957), and the earliest is October 18 (in 1948).

Precipitation.—Precipitation in this county is ample for farming. As shown in table 12, precipitation is heaviest late in spring and early in summer. A total fall of 5 inches sometimes occurs during a single storm. The northern part of the county receives on an average of 2 to 4 inches more precipitation annually than the southern part. Annual extremes range from about 23 inches to nearly 80 inches.

Droughts are less frequent in this county than in most of the Plains States. Severe to extreme droughts—those that only the most drought-resistant native plants can survive—occur no more frequently than once every 10 to 15 years and are of 3- to 5-months duration. The longest drought of recent years was the period 1954 through 1957, during which there were 23 consecutive months of drought. During a drought the climate of both the county and the State can be dominated by humid air from the Gulf of Mexico. Precipitation during this period commonly occurs as widely scattered afternoon showers.

The average annual evaporation is about 60 inches, which is in excess of the average total precipitation. In summer, evaporation rates may be as much as three-tenths of an inch a day. Thus, a large amount of soil moisture is lost during rain-free periods in the hot summer months.

The average amount of snowfall is 3.7 inches per season. This amount represents less than 1 inch of precipitation. A snowfall of 20 inches, in 1921, is the heaviest that has been recorded.

Severe local storms are infrequent, even though Franklin County is near the high-frequency tornado areas in Oklahoma. Forty tornadoes were recorded in the 46-year period 1916-61 in Franklin County and the six adjoining counties in west-central Arkansas. Thunderstorms occur on an average of 50 to 60 days a year.

Natural Resources

Franklin County is well supplied with streams and lakes, but some streams are dry part of the year. The principal streams are the Arkansas and Mulberry Rivers and White Oak, Hurricane, Mill, Smith, and Sixmile Creeks. The principal lakes are Ozark, Dardanelle, Shores, and those in the Sixmile Creek Watershed. All the lakes are manmade. Ozark and Dardanelle Lakes attract many sportsmen, vacationers, and retired people. There are about 1,750 farm ponds in the county.

The supply of underground water is adequate for farmstead water systems but in most areas is inadequate for irrigation. Wells are mostly 60 to 200 feet deep. The water is generally of good quality, but in many places it is moderately hard and moderately high in iron. Most of it can be used for household purposes. Additives that reduce hardness and lower the iron content improve the quality.

Coal is mined in the southern part of the county, north and east of Charleston. There are more than 10 active natural gasfields in the county.

Farming

The early economy of Franklin County was based on family-type farms that produced corn, cotton, wheat, oats, grasses and clovers, vegetables, and fruits for home use, and cattle and hogs for market as well as for home use. Peaches and grapes have been important commercial crops for several years.

According to the 1964 Census of Agriculture, about 60 percent of the total land acreage of the county is in farms, many of which contain wooded areas. The rest is largely woodland, part of which is public land in the Ozark National Forest and in the Fort Chaffee Military Reservation. The wooded tracts are mostly steep, stony mountainsides or hillsides. Some are level and poorly drained, and some are flood plains subject to overflow.

Between 1959 and 1964, the number of farms in the county decreased and the average size of farms increased. The greatest reduction in number was in farms 100 to 179 acres in size. Most of the farms are family-sized units, on which the family does most of the work with the help of occasional hired labor. In 1964 there were 1,032 farms in the county. Of the farm operators, 694 were full owners, 235 were part owners, and 103 were tenants.

The open land on most farms in Franklin County is used for pasture and meadow. Winter small grain is grown on many farms to supplement pastures. The bottom land along the Arkansas River is used for row crops and small grain. Only small acreages of row crops are grown in the uplands. Some farms produce peaches and grapes.

According to the U.S. Census of Agriculture, the acreages of principal crops in 1959 and 1964 were as follows:

Crop:	*Acres in 1959*	*Acres in 1964*
Soybeans	2,609	2,883
Corn	1,746	949
Cotton	252	205
Wheat and oats	2,480	1,155

From 1959 to 1964, the number of cattle and calves in the county increased from 25,877 to 32,319, but the number of milk cows decreased from 4,793 to 3,464. In this same period, the number of hogs and pigs decreased from 1,985 to 703. The broilers produced in 1964 numbered 2,212,964, and the turkeys 424,916.

Most crops produced in the county are marketed at Fort Smith and Dardanelle. Cattle are sold to midwestern feedlots. Broilers are processed at local plants. Some peaches are sold locally and some are shipped to more distant markets. Grapes are sold as fresh fruit or are made into wine at local wineries. Canneries at Alma and Fort Smith are good markets for truck crops. There are good outlets for saw logs at sawmills in nearby counties, and pulpwood is sold to local dealers and transported to a Morrilton papermill.

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(16) Waterways Experiment Station, Corps of Engineers.
1953. The unified soil classification system. Tech. Memo. 3–357, 2 v. and app.

Glossary

Alkali soil. Generally, a highly alkaline soil. Specifically, an alkali soil has so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that the growth of most crop plants is reduced.

Alluvium. Soil material, such as sand, silt, or clay, that has been deposited on land by streams.

Available water capacity. The difference between the amount of water in a soil at field capacity and the amount in the same soil at the permanent wilting point. Commonly expressed as inches of water per inch of soil depth.

Base saturation. The degree to which material that has base-exchange properties is saturated with exchangeable cations other than hydrogen, expressed as a percentage of the cation-exchange capacity.

Clay. As a soil separate, mineral soil particles that are less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Claypan. A compact, slowly permeable soil horizon that contains more clay than the horizon above and below it. A claypan is commonly hard when dry and plastic or stiff when wet.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent; will not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deforms by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material, and tends to stretch somewhat and pull apart, rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard and brittle; little affected by moistening.

Erosion. The wearing away of the land surface by wind, running water, and other geological agents.

Fragipan. A loamy, brittle, subsurface horizon that is very low in organic matter and clay but is rich in silt or very fine sand. The layer is seemingly cemented when dry, has a hard or very hard consistence, and has a high bulk density in comparison with the horizon or horizons above it. When moist, the fragipan tends to rupture suddenly if pressure is applied, rather than to deform slowly. The layer is generally mottled, is slowly or very slowly permeable to water, and has a few or many bleached fracture planes that form polygons. Fragipans are a few inches to several feet thick; they generally occur below the B horizon, 15 to 40 inches below the surface.

Gleyed soil. A soil in which waterlogging and lack of oxygen have caused the material in one or more horizons to be neutral gray in color. The term "gleyed" is applied to soil horizons with yellow and gray mottling caused by intermittent waterlogging.

Horizon, soil. A layer of soil, approximately parallel to the surface, that has distinct characteristics produced by soil-forming processes. These are the major horizons:

O Horizon. The layer of organic matter on the surface of a mineral soil. This layer consists of decaying plant residues.

A horizon. The mineral horizon at the surface or just below an O horizon. This horizon is the one in which living organisms are most active and therefore is marked by the accumulation of humus. The horizon may have lost one or more of soluble salts, clay, or sesquioxides (iron and aluminum oxides).

B horizon. The mineral horizon below an A horizon. The B horizon is in part a layer of change from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics caused (1) by accumulation of clay, sesquioxides, humus, or some combination of these; (2) by prismatic or blocky structure; (3) by redder or stronger colors than the A horizon; or (4) by some combination of these. Combined A and B horizons are usually called the solum, or true soil. If a soil lacks a B horizon, the A horizon alone is the solum.

C horizon. The weathered rock material immediately beneath the solum. In most soils this material is presumed to be like that from which the overlying horizons were formed. If the material is known to be different from that in the solum, a Roman numeral precedes the letter C.

R layer. Consolidated rock beneath the soil. The rock usually underlies a C horizon but may be immediately beneath an A or B horizon.

Mottling, soil. Irregular marking with spots of different colors that vary in number and size. Mottling in soils usually indicates poor aeration and lack of drainage. Descriptive terms are as follows: Abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are these: *fine,* less than 5 millimeters (about 0.2 inch) in diameter along the greatest dimension; *medium,* ranging from 5 millimeters to 15 millimeters (about 0.2 to 0.6 inch) in diameter along the greatest dimension; and *coarse,* more than 15 millimeters (about 0.6 inch) in diameter along the greatest dimension.

Ped. An individual natural soil aggregate, such as a crumb, a prism, or a block, in contrast to a clod.

Permeability. The capacity of the soil to transmit air or water. Terms used to describe permeability are as follows: *very slow, slow, moderately slow, moderate, moderately rapid, rapid,* and *very rapid.*

pH value. A numerical means for designating acidity and alkalinity in soils. A pH value of 7.0 indicates precise neutrality; a higher value, alkalinity; and a lower value, acidity.

Plowpan. A compacted layer formed in the soil immediately below the plowed layer.

Profile, soil. A vertical section of the soil through all its horizons and extending into the parent material.

Reaction, soil. The degree of acidity or alkalinity of a soil, expressed in pH values or words as follows:

	pH		*pH*
Extremely acid	Below 4.5	Neutral	6.6 to 7.3
Very strongly acid	4.5 to 5.0	Mildly alkaline	7.4 to 7.8
Strongly acid	5.1 to 5.5	Moderately alkaline	7.9 to 8.4
Medium acid	5.6 to 6.0	Strongly alkaline	8.5 to 9.0
Slightly acid	6.1 to 6.5	Very strongly alkaline	9.1 and higher

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum. Unconsolidated, partly weathered mineral material that accumulates over disintegrating solid rock. Residual material is not soil but is frequently the material from which a soil forms.

Sand. As a soil separate, individual rock or mineral fragments 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz, but sand may be of any mineral composition. As a textural class, soil that is 85 percent or more sand and not more than 10 percent clay.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Solum. The upper part of a soil profile, above the parent material, in which the processes of soil formation are active. The solum in mature soil includes the A and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or clusters that are separated from adjoining aggregates and have properties unlike those of an equal mass of unaggregated primary soil particles. The prinicipal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular. Structureless* soils are (1) *single grain* (each grain by itself, as in dune sand) or (2) *massive* (the particles adhering together without any regular cleavage, as in many claypans and hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the profile below plow depth.

Surface soil. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, about 5 to 8 inches in thickness. The plowed layer.

Texture soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand*, *loamy sand*, *sandy loam*, *loam*, *silt loam*, *silt*, *sandy clay loam*, *clay loam*, *silty clay loam*, *sandy clay*, *silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by adding the words "coarse," "fine," or "very fine" to the name of the textural class.

Tilth, soil. The condition of the soil, especially as to soil structure, in relation to the growth of plants. Good tilth refers to the friable state and is associated with high noncapillary porosity and stable, granular structure. A soil in poor tilth is nonfriable, hard, nonaggregated, and difficult to till.

Water table. The highest part of the soil or underlying rock material that is wholly saturated with water. In some places an upper, or perched, water table may be separated from a lower one by a dry zone.

GUIDE TO MAPPING UNITS

For complete information about a mapping unit, read both the description of the mapping unit and that of the soil series to which the mapping unit belongs.

All range sites are described on pages 77 and 78. Other information about the mapping units is given in tables as follows:

Acreage and extent, table 1, page 9.
Predicted yields, table 2, page 51.
Engineering use of the soils, table 3, page 54, table 4, page 56, and table 5, page 60.
Nonfarm use of the soils, table 6, page 66.
Woodland groups, table 7, page 72.
Wildlife groups, table 8, page 80.

The mapping units identified by map symbols made up entirely of capital letters are of more varied composition than the others, but the composition of these units was controlled well enough that interpretations for expected uses can be made.

Map symbol	Mapping unit	Described on page	Capability unit		Woodland group	Wildlife group	Range site
			Symbol	Page	Number	Number	Name
AgC	Allen gravelly fine sandy loam, 3 to 8 percent slopes	10	IIIe-1	45	4o7	6	----
AgD	Allen gravelly fine sandy loam, 8 to 12 percent slopes	10	IVe-1	46	4o7	7	----
AsD	Allen stony fine sandy loam, 8 to 12 percent slopes	10	IVe-2	47	4x8	11	----
AsE	Allen stony fine sandy loam, 12 to 45 percent slopes	11	VIIe-1	49	4x8	11	----
ADB	Allen soils, gently rolling	11	IIIe-1	45	4o7	6	----
ADD	Allen soils, rolling	11	VIe-1	48	4r9	7	----
ADE	Allen soils, steep	11	VIIe-1	49	4r9	7	----
AED	Allen-Enders association, rolling	11	------	--	---	--	----
	Allen soils	--	VIe-1	48	4r9	7	----
	Enders soils	--	VIe-2	48	4r3	7	----
AEE	Allen-Enders association, steep	12	------	--	---	--	----
	Allen soils	--	VIIe-1	49	4r9	7	----
	Enders soils	--	VIIs-1	49	4r3	7	----
AEF	Allen-Enders association, very steep	12	------	--	---	--	----
	Allen soils	--	VIIe-1	49	4r9	8	----
	Enders soils	--	VIIs-1	49	4r3	8	----
AMD	Allen-Mountainburg association, rolling	12	------	--	---	--	----
	Allen and Linker soils	--	VIe-1	48	4r9	7	----
	Mountainburg soils	--	VIIs-2	49	5d3	10	Sandstone Ridge
AME	Allen-Mountainburg association, steep	13	------	--	---	--	----
	Allen soils	--	VIIe-1	49	4r9	7	----
	Mountainburg soils	--	VIIs-2	49	5d3	10	Sandstone Ridge
AMF	Allen-Holston association, very steep	13	------	--	---	--	----
	Allen and Holston soils	--	VIIe-1	49	4r9	8	----
	Mountainburg soils	--	VIIs-2	49	5d3	10	Sandstone Ridge
Br	Bruno loamy fine sand	14	IIIs-1	46	2s8	3	----
Bu	Bruno and Iuka soils	14	------	--	---	--	----
	Bruno soils	--	Vw-1	48	2s8	3	----
	Iuka soils	--	Vw-1	48	2s8	1	----
Ca	Caspiana silt loam	15	I-1	43	2o7	1	----
CrA	Cleora fine sandy loam, 0 to 1 percent slopes	15	I-1	43	2o7	1	----

GUIDE TO MAPPING UNITS--Continued

Map symbol	Mapping unit	De-scribed on page	Capability unit		Woodland group	Wildlife group	Range site
			Symbol	Page	Number	Number	Name
CrB	Cleora fine sandy loam, 1 to 3 percent slopes	16	IIe-4	44	2o7	1	----
Cy	Cobbly alluvial land	16	VIIs-4	50	3x9	11	----
DbA	Dubbs fine sandy loam, 0 to 1 percent slopes	16	I-1	43	3o7	1	----
DbB	Dubbs fine sandy loam, 1 to 3 percent slopes	17	IIe-4	44	3o7	1	----
DC	Dubbs and Cleora soils	17	-----	--	---	--	----
	Dubbs soils	--	IIe-4	44	3o7	1	----
	Cleora soils	--	IIe-4	44	2o7	1	----
	Pickwick soils	--	IIIe-1	45	3o7	1	----
EnC2	Enders gravelly silt loam, 3 to 8 percent slopes, eroded	18	IVe-4	47	4o1	9	----
EnD2	Enders gravelly silt loam, 8 to 20 percent slopes, eroded	18	VIe-2	48	4r3	7	----
EsF	Enders stony fine sandy loam, 12 to 50 percent slopes	18	VIIs-1	49	5x3	11	----
EMD	Enders-Mountainburg association, rolling	19	------	--	---	--	----
	Enders soils	--	VIIs-1	49	4r3	7	----
	Montevallo soils	--	VIIs-2	49	5d3	10	Shale Break
	Mountainbrug soils	--	VIIs-2	49	5d3	10	Sandstone Ridge
EME	Enders-Mountainburg association, steep	20	------	--	---	--	----
	Enders soils	--	VIIs-1	49	4r3	7	----
	Montevallo soils	--	VIIs-2	49	5d3	10	Shale Break
	Mountainburg soils	--	VIIs-2	49	5d3	10	Sandstone Ridge
Fc	Falkner complex, mounded	20	IVw-1	47	5w8	4	Loamy Prairie
FlA	Falkner silt loam, 0 to 1 percent slopes	21	IIIw-1	46	5w8	4	Loamy Prairie
FlB	Falkner silt loam, 1 to 3 percent slopes	21	IIIw-1	46	5w8	4	Loamy Prairie
Gt	Guthrie silt loam	22	IVw-1	47	5w5	5	----
Gu	Guthrie silt loam, flooded	23	Vw-1	48	5w5	5	----
HaB	Hartsells fine sandy loam, 1 to 3 percent slopes	23	IIe-1	43	4o7	6	----
HaC	Hartsells fine sandy loam, 3 to 8 percent slopes	23	IIIe-1	45	4o7	6	----
HLD	Holston soils, rolling	24	VIe-1	48	4r9	7	----
HLE	Holston soils, steep	24	VIIe-1	49	4r9	7	----
HOD	Holston-Enders association, rolling	24	------	--	---	--	----
	Holston soils	--	VIe-1	48	4r9	7	----
	Enders soils	--	VIIs-1	49	4r3	7	----
HOE	Holston-Enders association, steep	25	------	--	---	--	----
	Holston soils	--	VIIe-1	49	4r9	7	----
	Enders soils	--	VIIs-1	49	4r3	7	----
HOF	Holston-Enders association, very steep	25	------	--	---	--	----
	Holston soils	--	VIIe-1	49	4r9	8	----
	Enders soils	--	VIIs-1	49	4r3	8	----
Ib	Iberia clay	26	IIIw-2	46	3w5	2	----
Lc	Leadvale complex, mounded	28	IIIw-1	46	3o7	4	----
LeB	Leadvale silt loam, 1 to 3 percent slopes	28	IIe-2	43	3o7	4	----
LeC2	Leadvale silt loam, 3 to 8 percent slopes, eroded	28	IIIe-2	45	3o7	4	----

GUIDE TO MAPPING UNITS--Continued

Map symbol	Mapping unit	Described on page	Capability unit		Woodland group	Wildlife group	Range site
			Symbol	Page	Number	Number	Name
L1D2	Leadvale loam, 8 to 12 percent slopes, eroded	28	IVe-3	47	3o7	4	----
LnB	Linker fine sandy loam, 1 to 3 percent slopes	30	IIe-1	43	4o7	6	----
LnC	Linker fine sandy loam, 3 to 8 percent slopes	30	IIIe-1	45	4o7	6	----
LnD	Linker fine sandy loam, 8 to 12 percent slopes	30	IVe-1	46	4o7	7	----
LKB	Linker soils, gently rolling	30	IIIe-1	45	4o7	6	----
LMB	Linker-Mountainburg association, gently rolling	30	------	--	---	--	----
	Linker soils	--	IIIe-1	45	4o7	6	----
	Mountainburg soils	--	IVe-5	47	5d3	10	Sandstone Ridge
MkC	McKamie silt loam, 3 to 8 percent slopes	32	IVe-4	47	4o1	9	----
MlC	Montevallo gravelly silt loam, 3 to 8 percent slopes	32	IVe-5	47	5d3	10	Shale Break
MmD	Montevallo-Mountainburg complex, 1 to 12 percent slopes	32	-----	--	---	--	----
	Montevallo soils	--	VIs-1	49	5d3	10	Shale Break
	Mountainburg soils	--	VIs-1	49	5d3	10	Sandstone Ridge
MmE	Montevallo-Mountainburg complex, 12 to 40 percent slopes	33	-----	--	---	--	----
	Montevallo soils	--	VIIs-2	49	5d3	10	Shale Break
	Mountainburg soils	--	VIIs-2	49	5d3	10	Sandstone Ridge
Mo	Moreland silty clay loam	33	IIw-1	45	3w5	2	----
Ms	Morganfield very fine sandy loam	34	I-1	43	2o7	1	----
MtB	Mountainburg gravelly fine sandy loam, 1 to 3 percent slopes	34	IIIe-4	45	5d3	10	Sandstone Ridge
MtC	Mountainburg gravelly fine sandy loam, 3 to 8 percent slopes	34	IVe-5	47	5d3	10	Sandstone Ridge
MtD	Mountainburg gravelly fine sandy loam, 8 to 12 percent slopes	35	VIe-3	49	5d3	10	Sandstone Ridge
MuD	Mountainburg stony fine sandy loam, 1 to 12 percent slopes	35	VIs-1	49	5x3	10	Sandstone Ridge
MuE	Mountainburg stony fine sandy loam, 12 to 40 percent slopes	35	VIIs-2	49	5x3	10	Sandstone Ridge
MRE	Mountainburg-Rock land association, steep	35	------	--	---	--	----
	Mountainburg soils	--	VIIs-2	49	5d3	10	Sandstone Ridge
	Rock land	--	VIIs-3	50	5x8	10	Sandstone Ledge
Mw	Muldrow silt loam	36	IIIw-2	46	3w5	2	----
MzB	Muskogee silt loam, 1 to 3 percent slopes	36	IIe-3	43	4o1	9	----
MzC	Muskogee silt loam, 3 to 8 percent slopes	37	IIIe-3	45	4o1	9	----
OrC2	Ora fine sandy loam, 3 to 8 percent slopes, eroded	37	IIIe-2	45	3o7	4	----
PsB2	Pickwick silt loam, 1 to 3 percent slopes, eroded	38	IIe-1	43	3o7	6	----
PsC2	Pickwick silt loam, 3 to 8 percent slopes, eroded	38	IIIe-1	45	3o7	6	----
Ro	Rock land	38	VIIs-3	50	5x8	10	Sandstone Ledge
Tc	Taft complex, mounded	39	IVw-1	47	3w8	4	----
TfA	Taft silt loam, 0 to 1 percent slopes	39	IIIw-1	46	3w8	4	----
TfB	Taft silt loam, 1 to 3 percent slopes	39	IIIw-1	46	3w8	4	----
Wg	Wing silt loam	41	VIs-2	49	5t0	12	Alkali Flats

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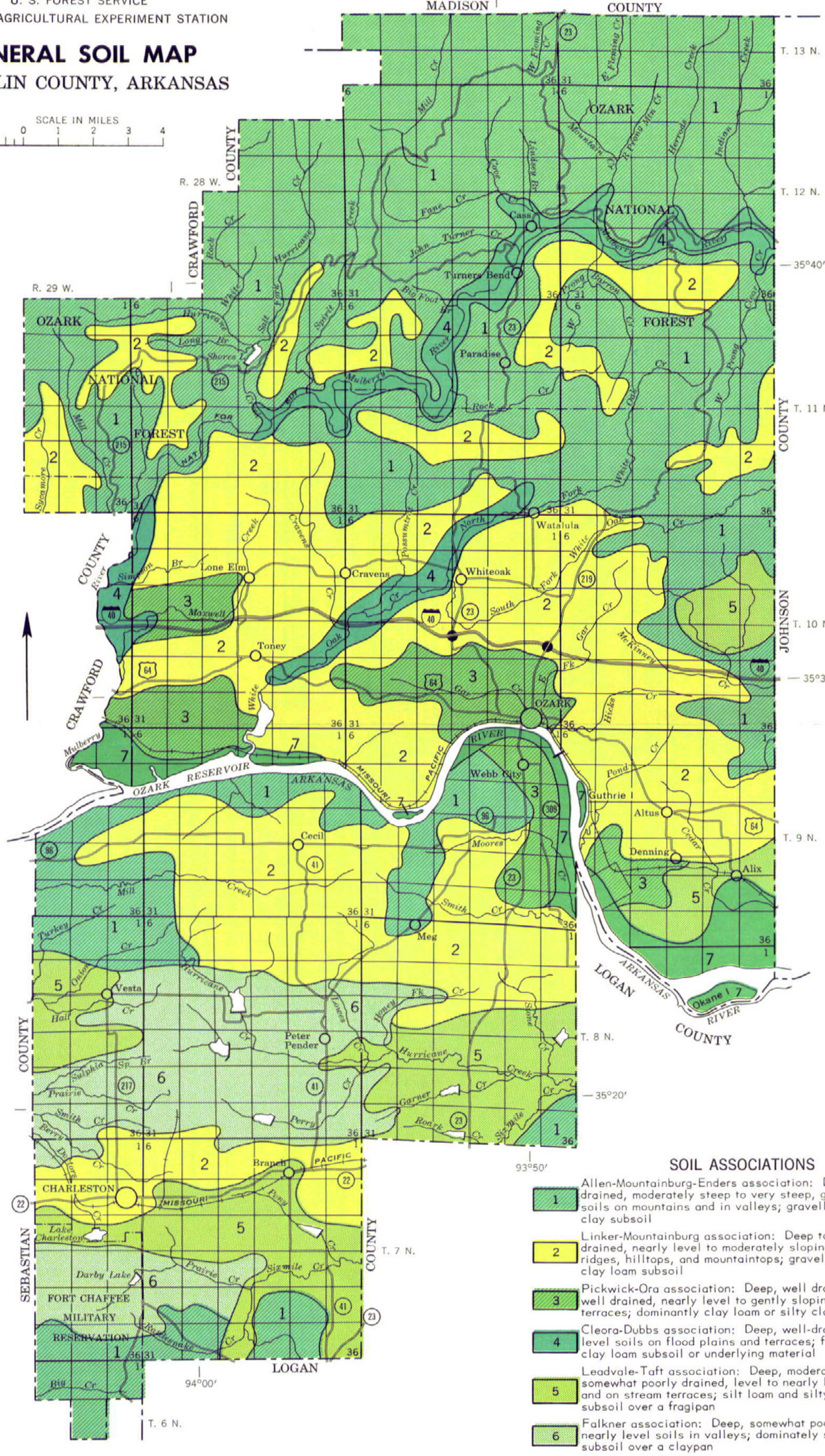
U. S. FOREST SERVICE
ARKANSAS AGRICULTURAL EXPERIMENT STATION

GENERAL SOIL MAP

FRANKLIN COUNTY, ARKANSAS

SCALE IN MILES
1 0 1 2 3 4

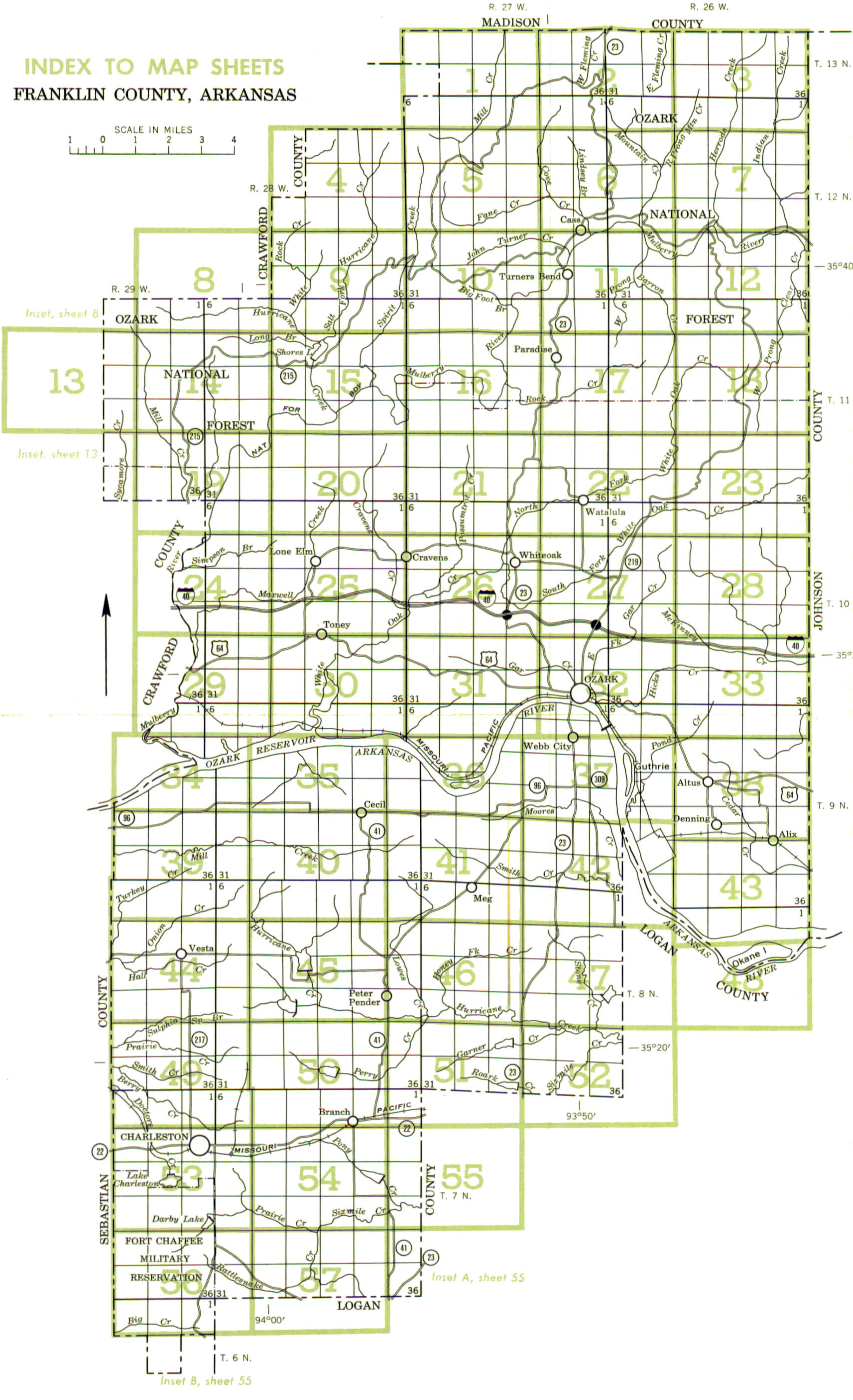


SOIL ASSOCIATIONS

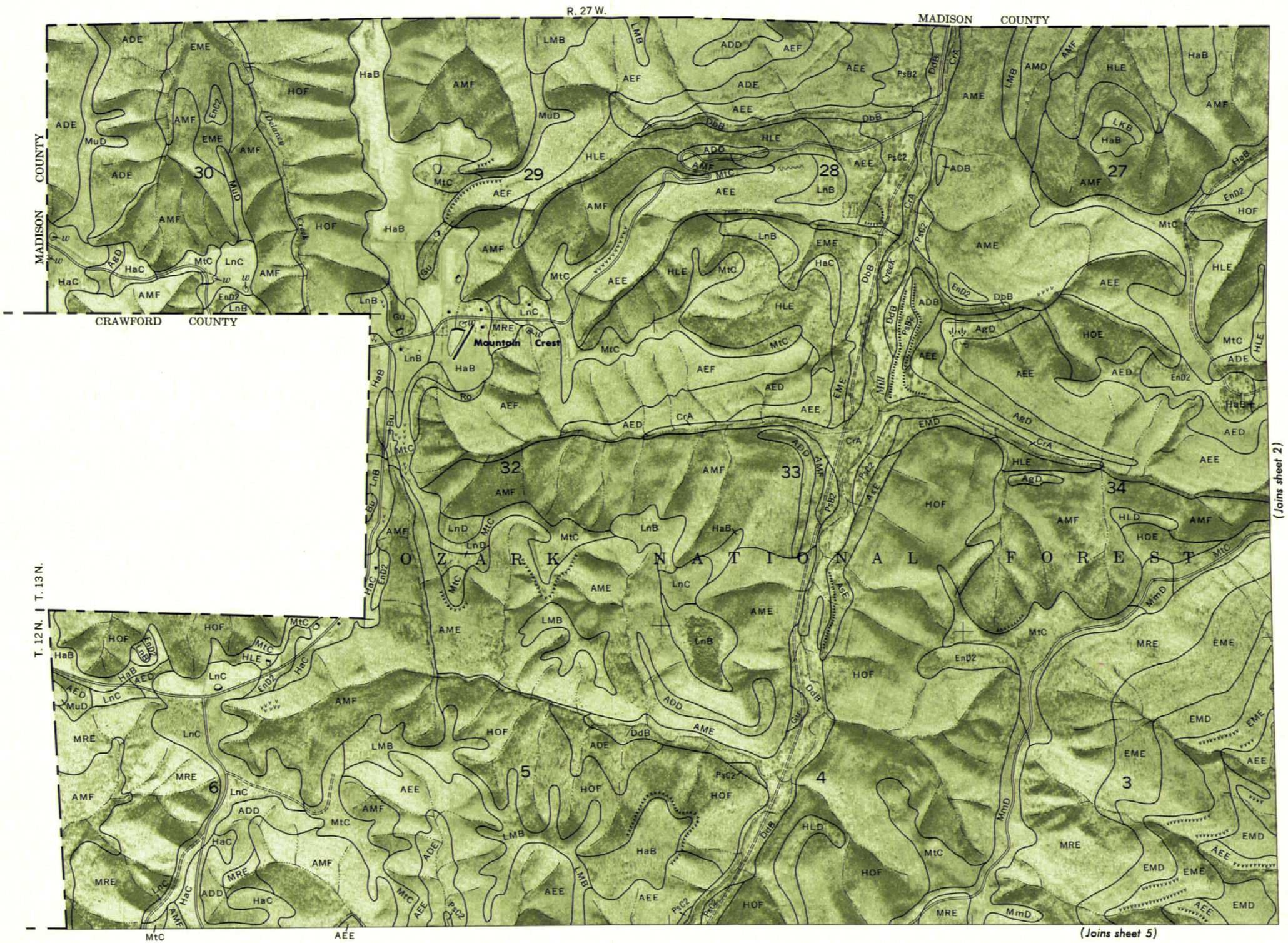
1. Allen-Mountainburg-Enders association: Deep to shallow, well-drained, moderately steep to very steep, gravelly and stony soils on mountains and in valleys; gravelly fine sandy loam to clay subsoil
2. Linker-Mountainburg association: Deep to shallow, well-drained, nearly level to moderately sloping and rolling soils on ridges, hilltops, and mountaintops; gravelly fine sandy loam to clay loam subsoil
3. Pickwick-Ora association: Deep, well drained to moderately well drained, nearly level to gently sloping soils on stream terraces; dominantly clay loam or silty clay loam subsoil
4. Cleora-Dubbs association: Deep, well-drained, level to nearly level soils on flood plains and terraces; fine sandy loam to clay loam subsoil or underlying material
5. Leadvale-Taft association: Deep, moderately well drained to somewhat poorly drained, level to nearly level soils in valleys and on stream terraces; silt loam and silty clay loam upper subsoil over a fragipan
6. Falkner association: Deep, somewhat poorly drained, level to nearly level soils in valleys; dominately silty clay loam upper subsoil over a claypan
7. Bruno-Morganfield-Caspiana association: Deep, excessively drained to well-drained, level to gently sloping and undulating soils on flood plains; loamy fine sand to clay loam subsoil or underlying material

March 1969

INDEX TO MAP SHEETS
FRANKLIN COUNTY, ARKANSAS



FRANKLIN COUNTY, ARKANSAS — SHEET NUMBER 1



FRANKLIN COUNTY, ARKANSAS NO. 1

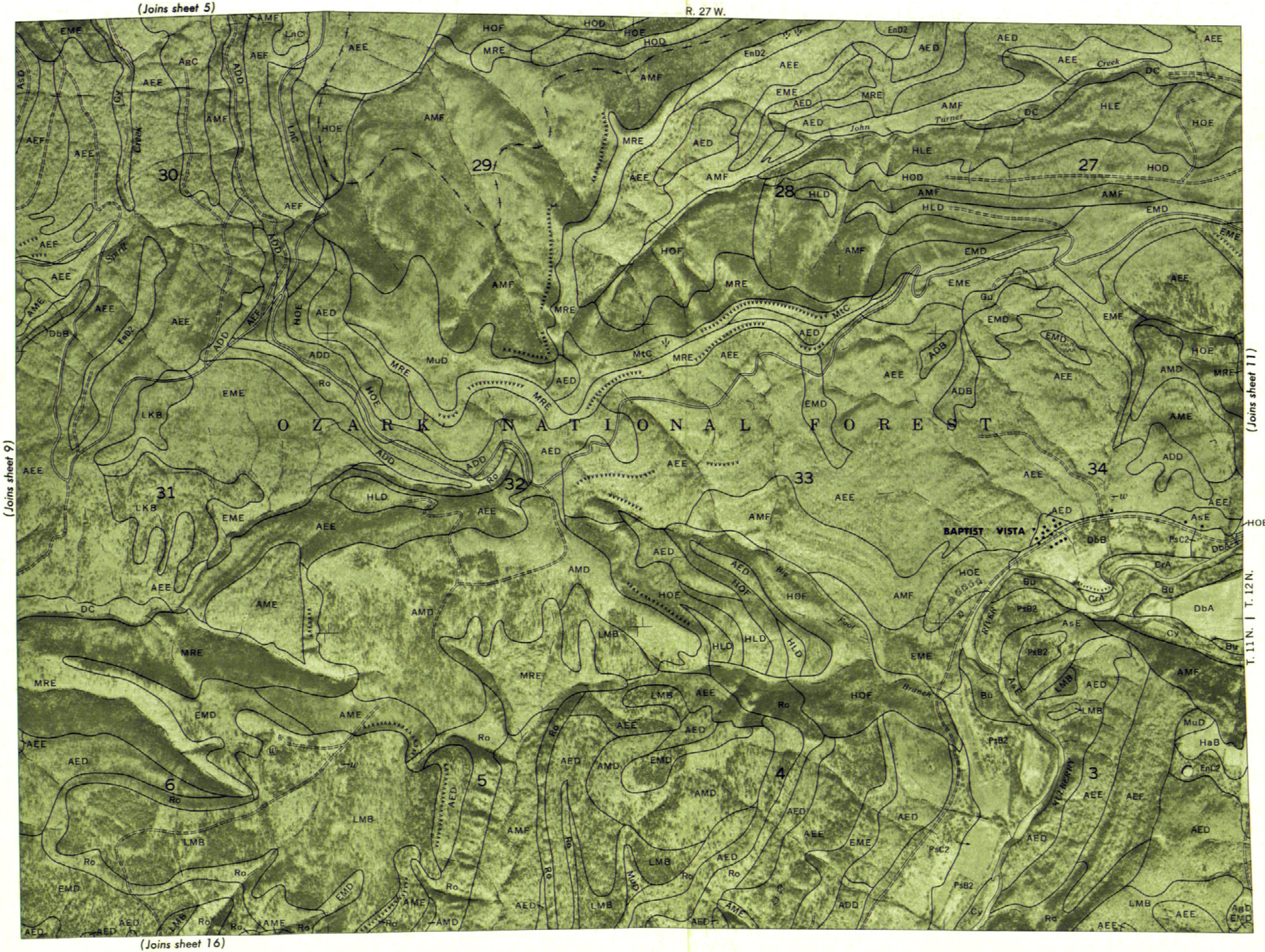
This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, Arkansas Agricultural Experiment Station and the U. S. Forest Service.
Land division corners and numbers shown on this map are indefinite.

10

N

R. 27 W.

(Joins sheet 5)



(Joins sheet 11)

T. 11 N. | T. 12 N.

1 Mile
5000 Feet

Scale 1:20000

(Joins sheet 9)

(Joins sheet 16)

FRANKLIN COUNTY, ARKANSAS NO. 11

R. 27 W. | R. 26 W.

T. 11 N. | T. 12 N.

(Joins sheet 10)

(Joins sheet 6)

(Joins sheet 12)

(Joins sheet 17)

OZARK NATIONAL FOREST

Turners Bend

North Liberty School

RIVER

Creek

Prong

Bayou

MULBERRY

John Turner

11

N

1 Mile

5000 Feet

Scale 1:20000

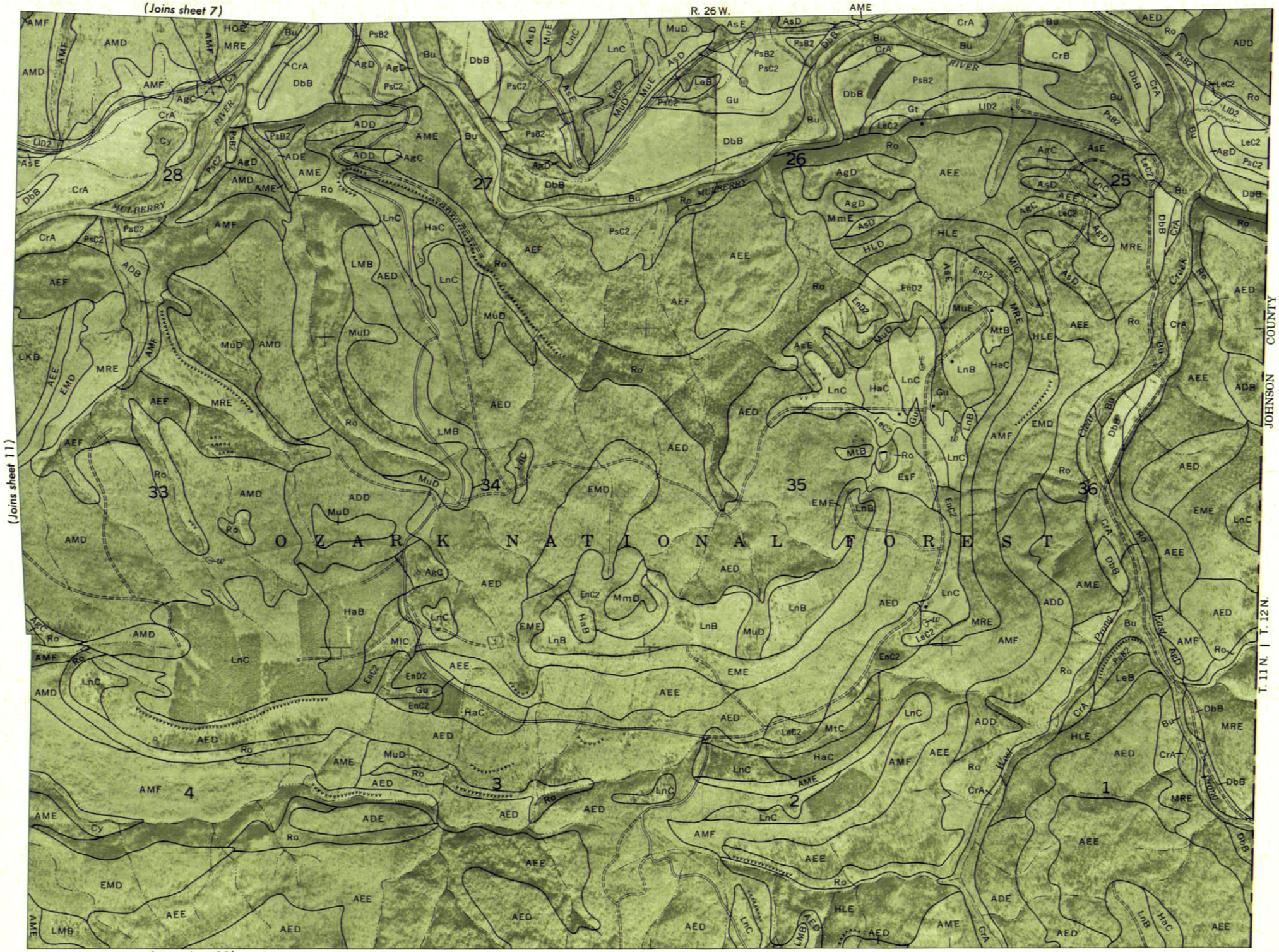
12

N

(Joins sheet 7)

R. 26 W.

AME



(Joins sheet 11)

(Joins sheet 18)

1 Mile 5000 Feet

Scale 1:20000

0 0

¼ 1000

½ 2000

¾ 3000

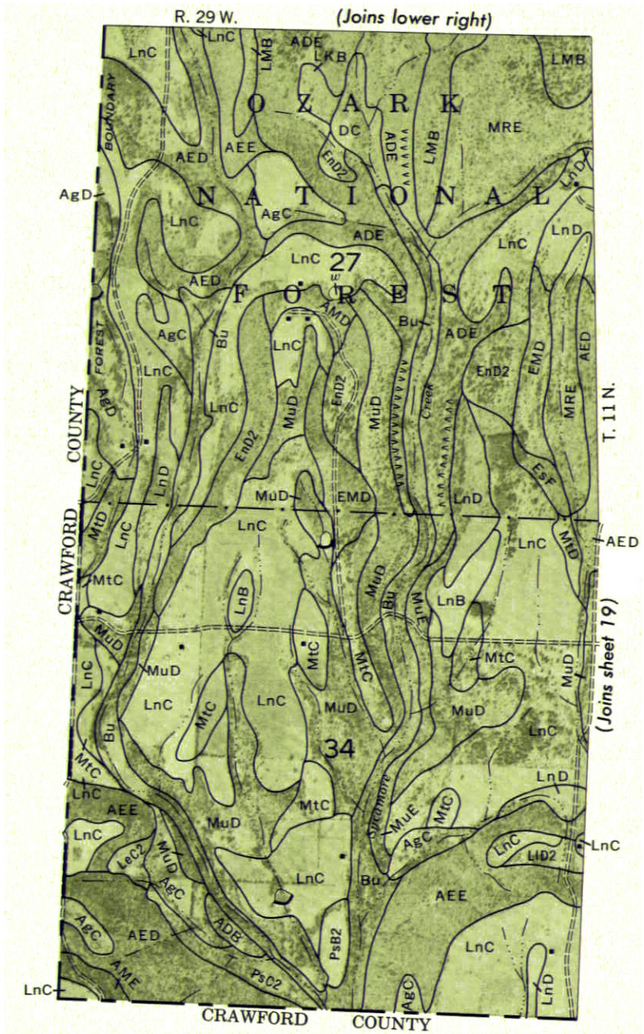
1 4000

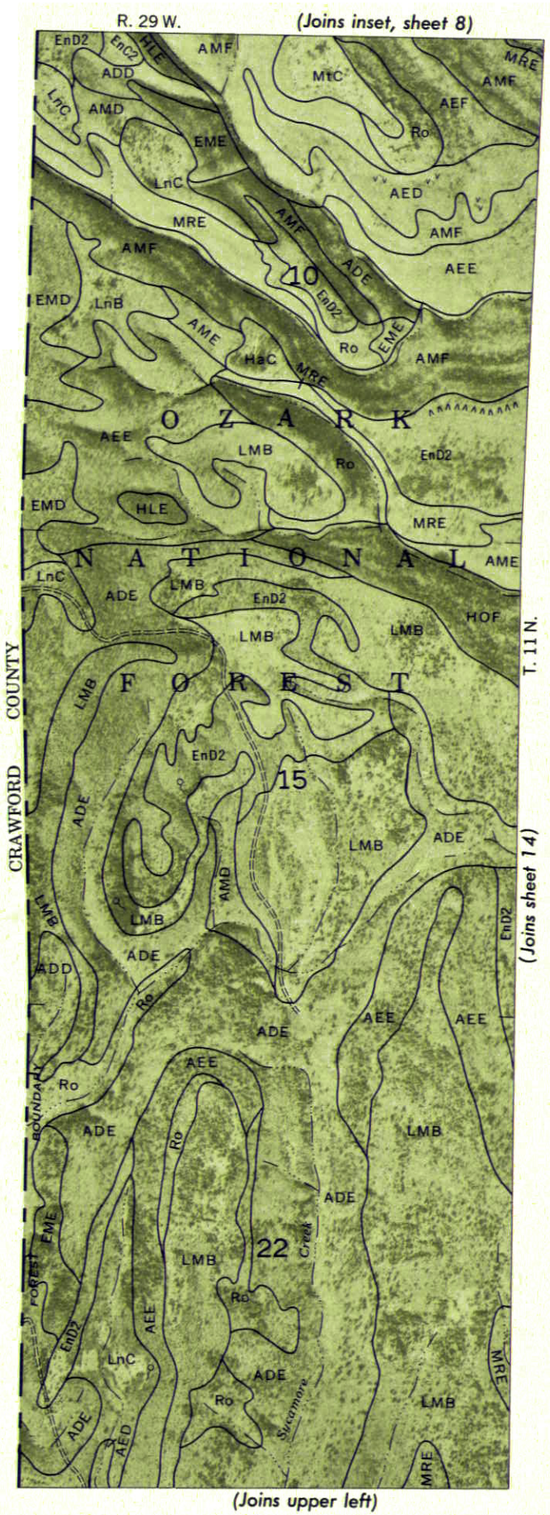
5000

FRANKLIN COUNTY, ARKANSAS NO. 12

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, Arkansas Agricultural Experiment Station and the U. S. Forest Service.
Land division corners and numbers shown on this map are indefinite.

FRANKLIN COUNTY, ARKANSAS NO. 13





14

N

R. 29 W. | R. 28 W.

T. 11 N.

(Joins sheet 8)

(Joins sheet 15)

(Joins sheet 19)

OZARK NATIONAL FOREST

1 Mile

5000 Feet

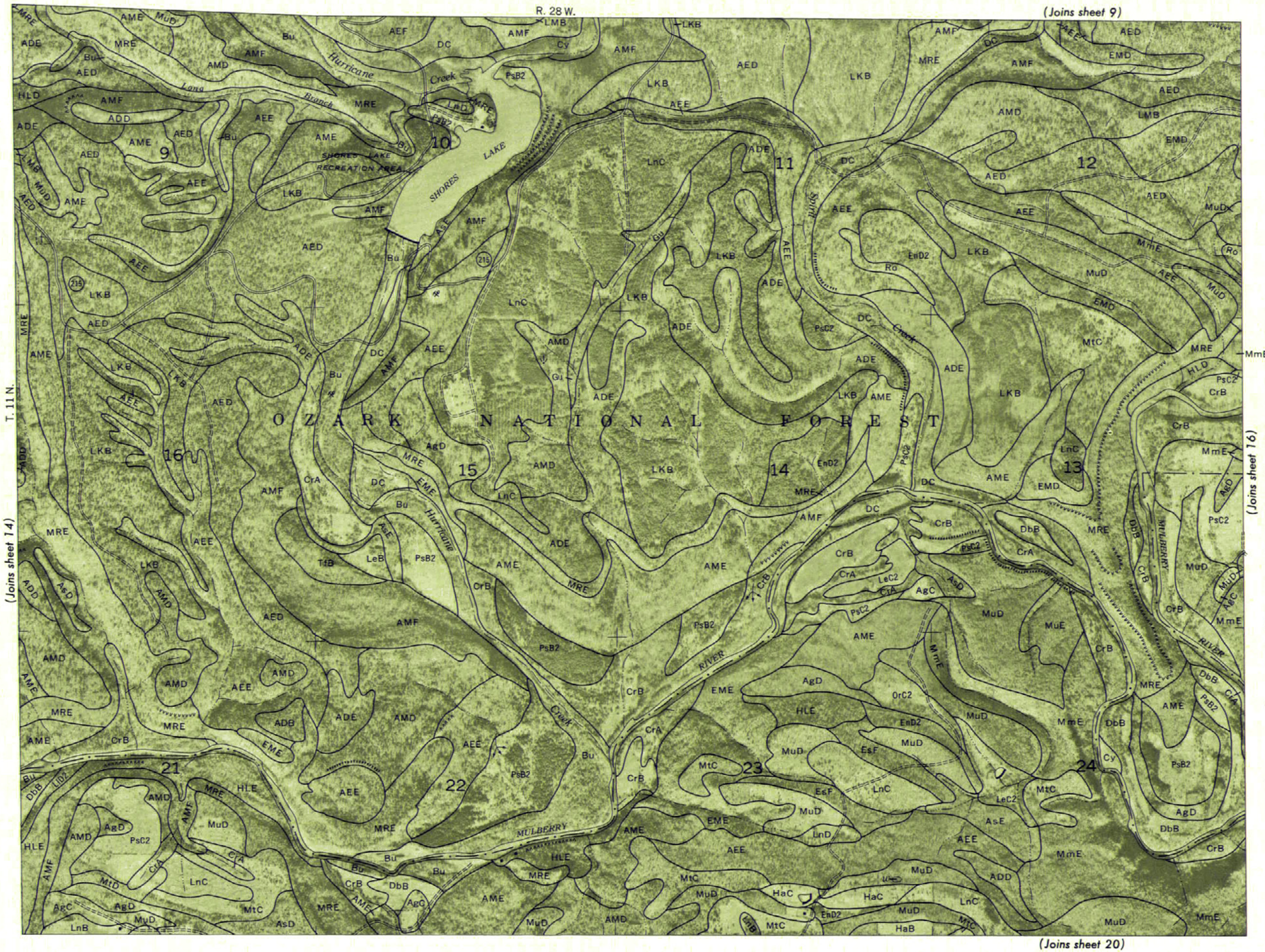
Scale 1:20000

(Joins sheet 13)

FRANKLIN COUNTY, ARKANSAS NO. 14

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, Arkansas Agricultural Experiment Station and the U. S. Forest Service.
Land division corners and numbers shown on this map are indefinite.

FRANKLIN COUNTY, ARKANSAS NO. 15



16

N

(Joins sheet 10)

R. 27 W.

T. 11 N.

1 Mile

5,000 Feet

Scale 1:20000

(Joins sheet 15)

OZARK NATIONAL FOREST

Oak Ridge School

Oak Ridge Cemetery

Mulberry River

Rock Creek

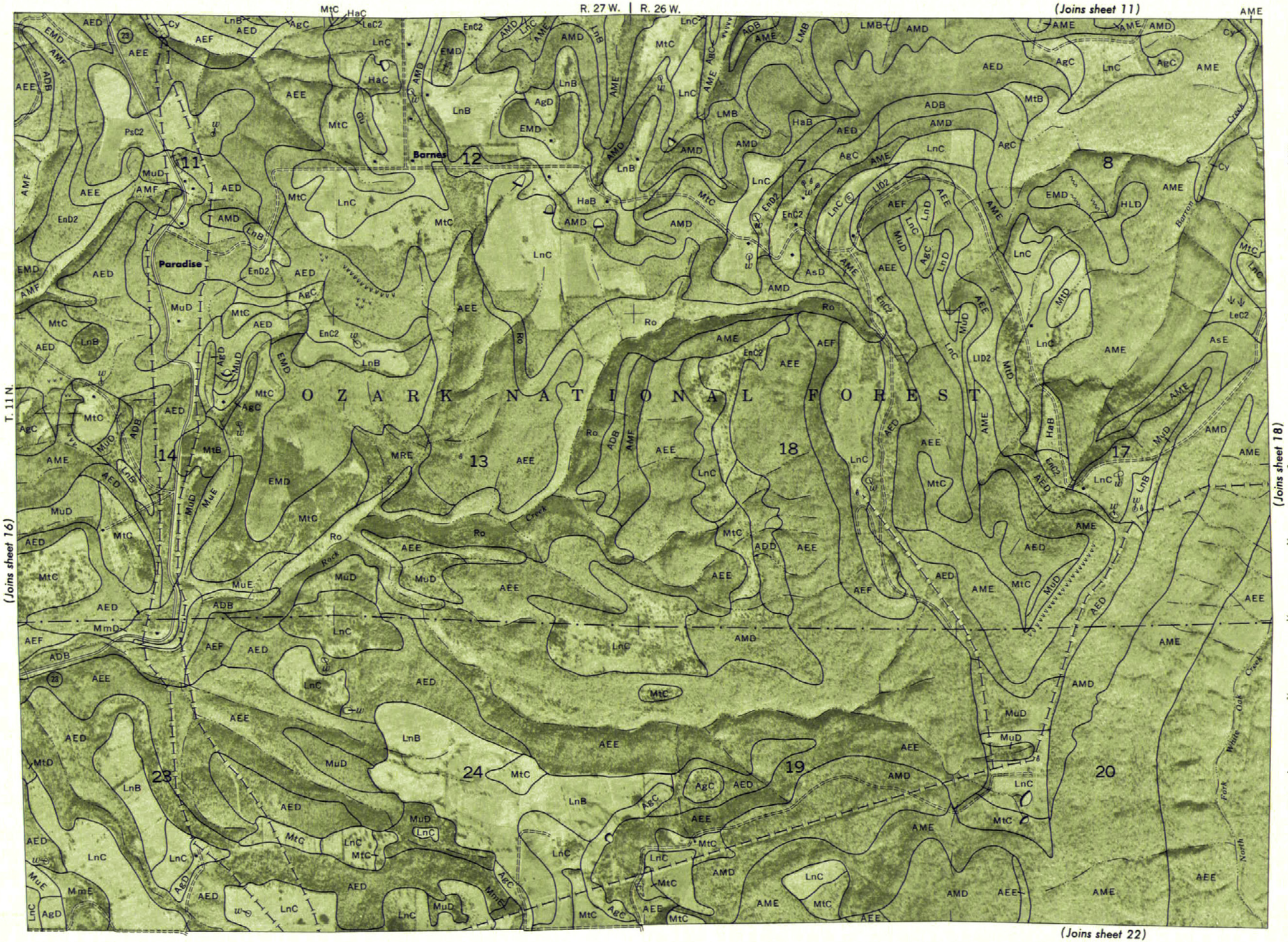
Jethro

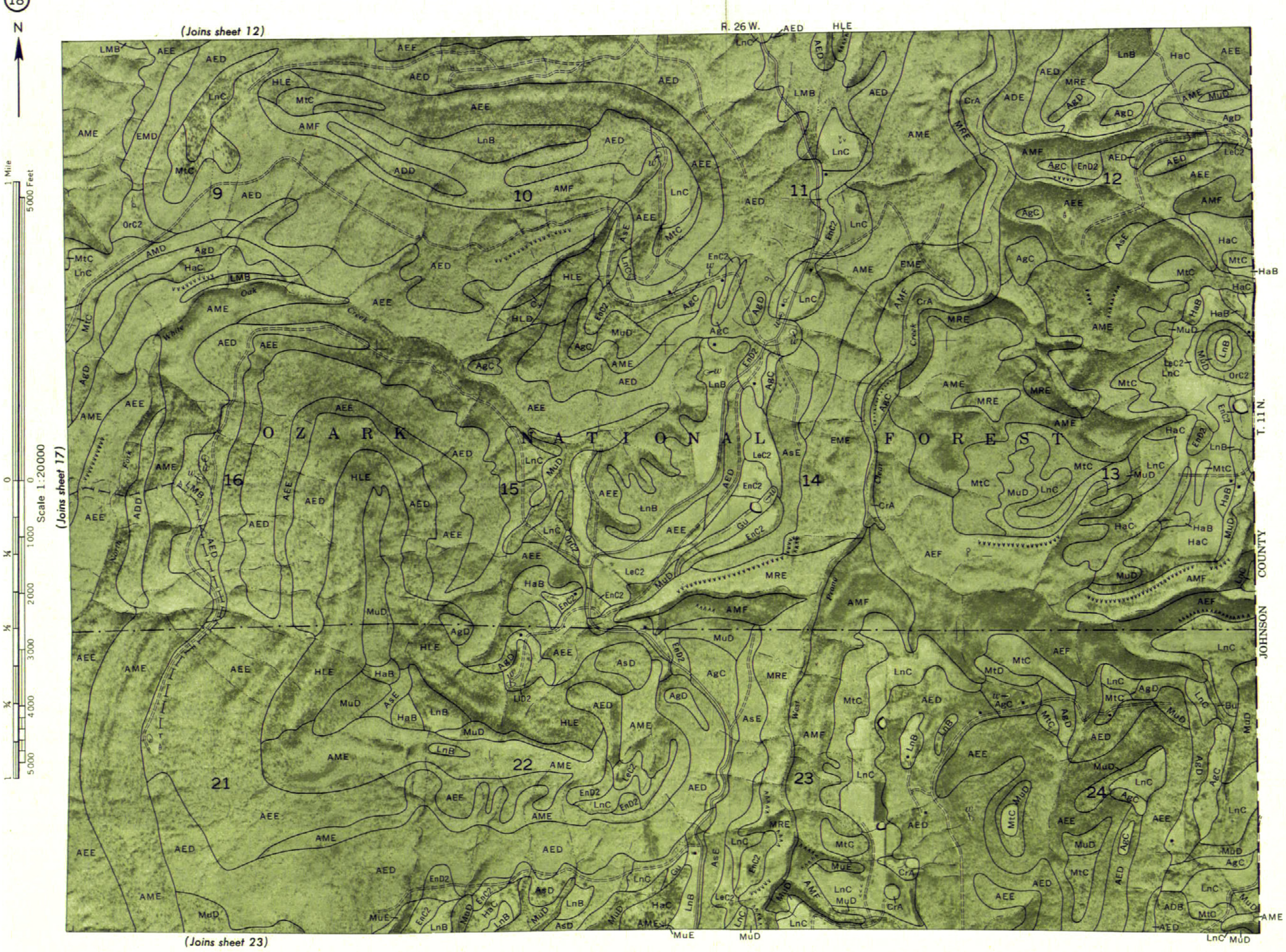
(Joins sheet 17)

(Joins sheet 21)

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, Arkansas Agricultural Experiment Station and the U. S. Forest Service.
Land division corners and numbers shown on this map are indefinite.

FRANKLIN COUNTY, ARKANSAS NO. 17

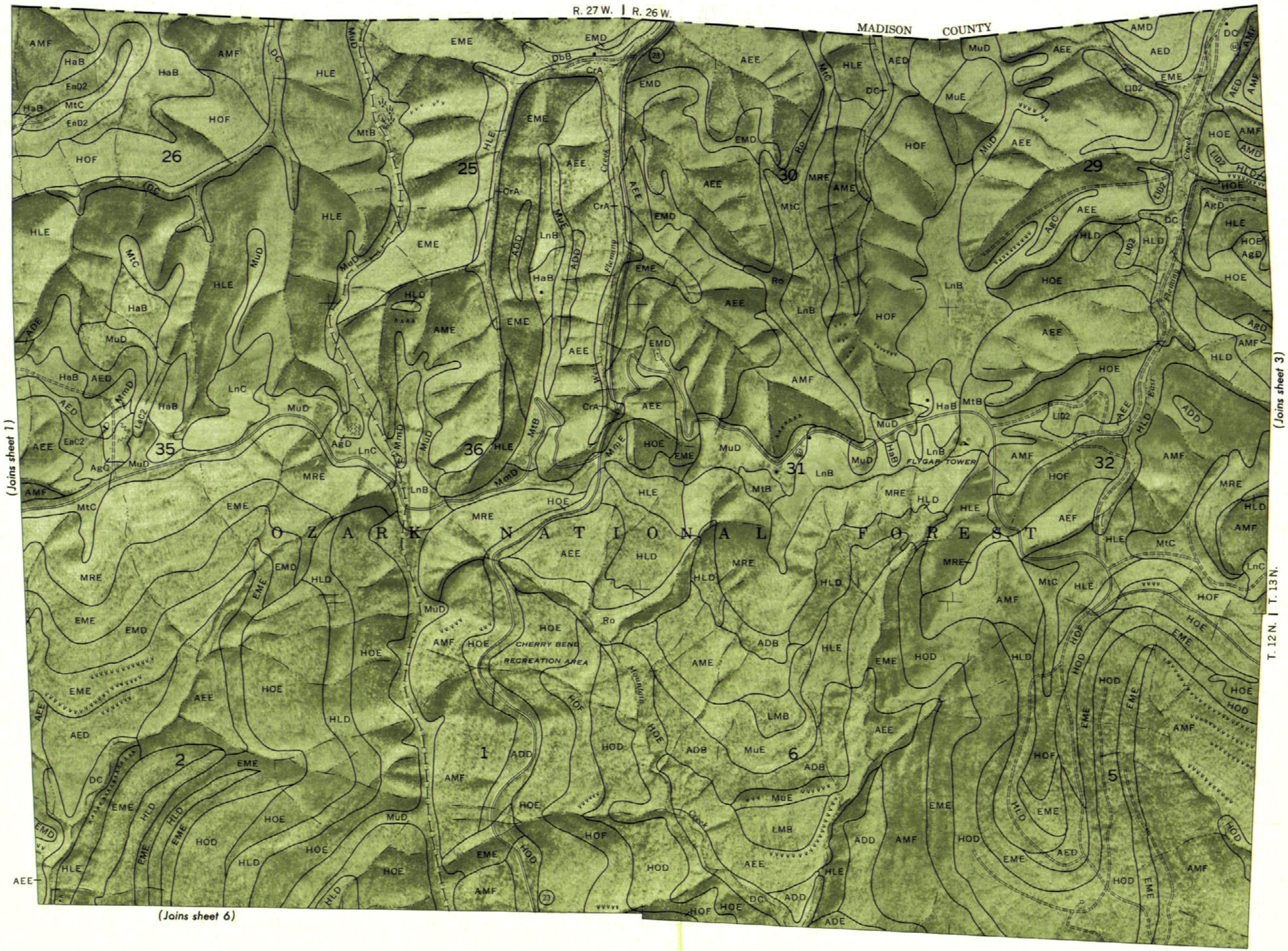



18
N
(Joins sheet 12)
R. 26 W.
OZARK NATIONAL FOREST
T. 11 N.
JOHNSON COUNTY
(Joins sheet 17)
(Joins sheet 23)
Scale 1:20000
1 Mile
5000 Feet
White Oak Creek
North Fork
Chalk Creek
Pond Creek
Wolf

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, Arkansas Agricultural Experiment Station and the U. S. Forest Service.
Land division corners and numbers shown on this map are indefinite.

FRANKLIN COUNTY, ARKANSAS NO. 19

FRANKLIN COUNTY, ARKANSAS — SHEET NUMBER 2



N

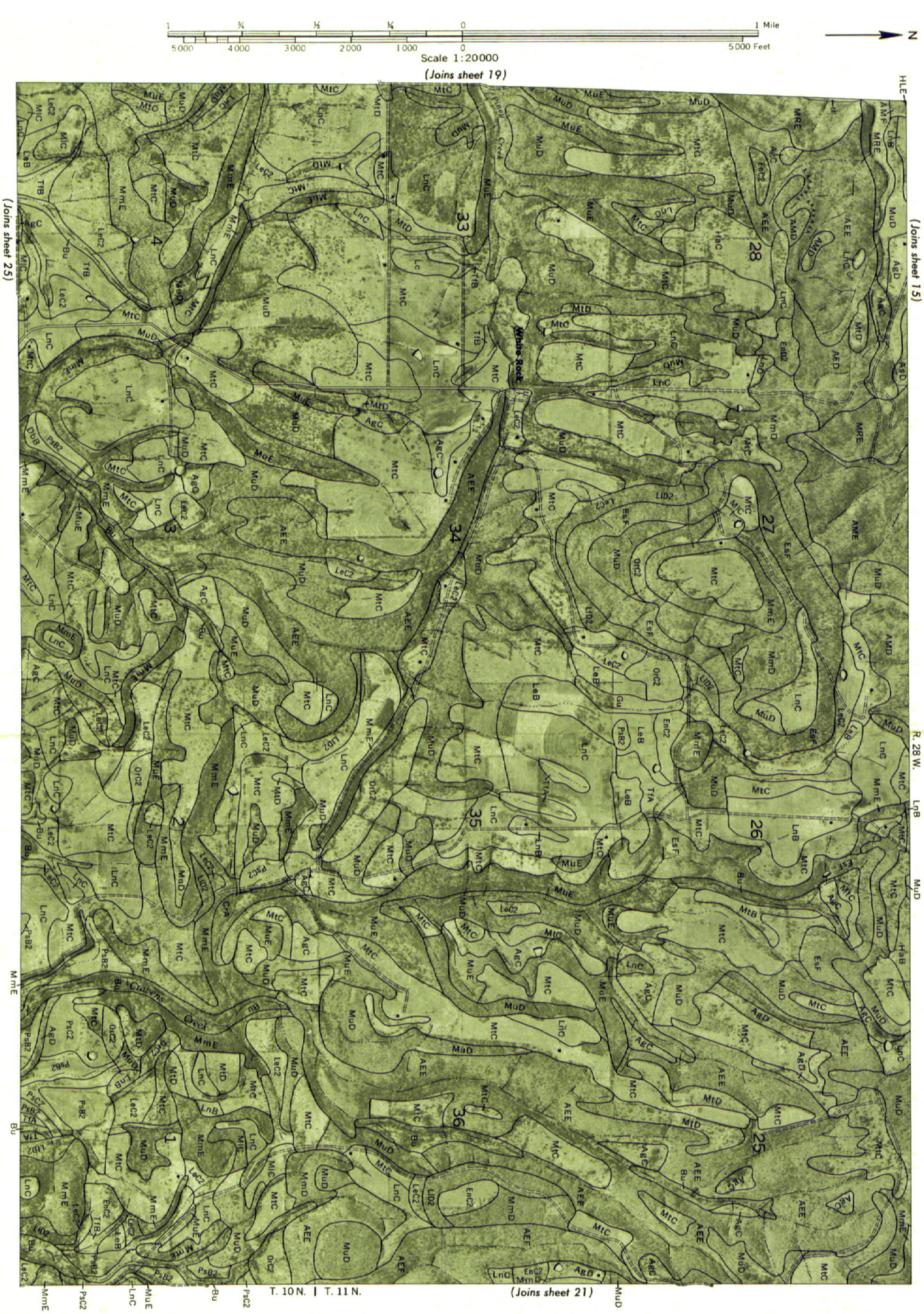
1 Mile

5000 Feet

Scale 1:20000

FRANKLIN COUNTY, ARKANSAS NO. 2

Land division corners and numbers shown on this map are indefinite.



FRANKLIN COUNTY, ARKANSAS — SHEET NUMBER 20

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, Arkansas Agricultural Experiment Station and the U. S. Forest Service.
Land division corners and numbers shown on this map are indefinite.

FRANKLIN COUNTY, ARKANSAS NO. 21

R. 27 W.

(Joins sheet 16)

(Joins sheet 20)

(Joins sheet 22)

(Joins sheet 26)

T. 10 N. | T. 11 N.

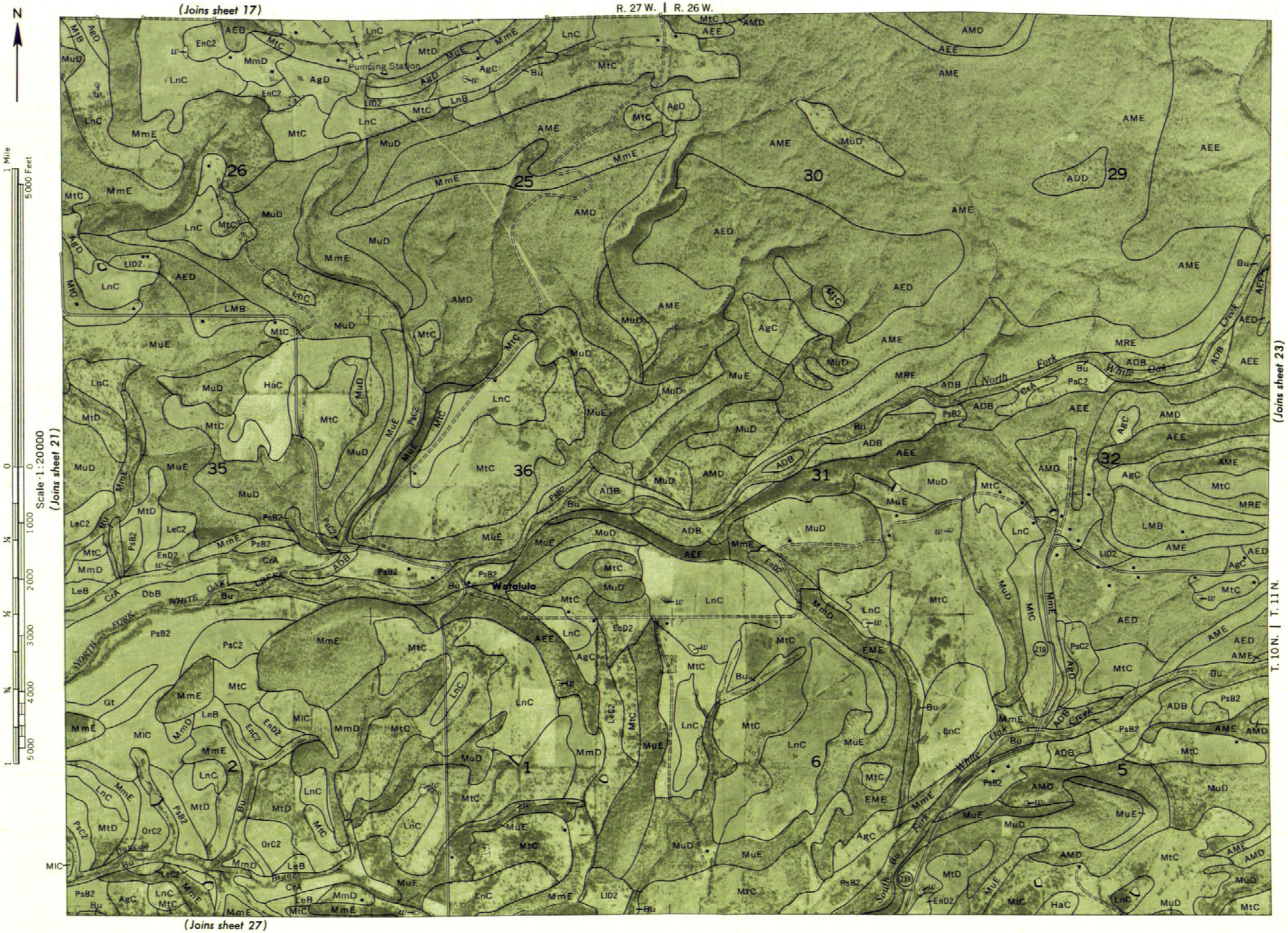
21

N

1 Mile

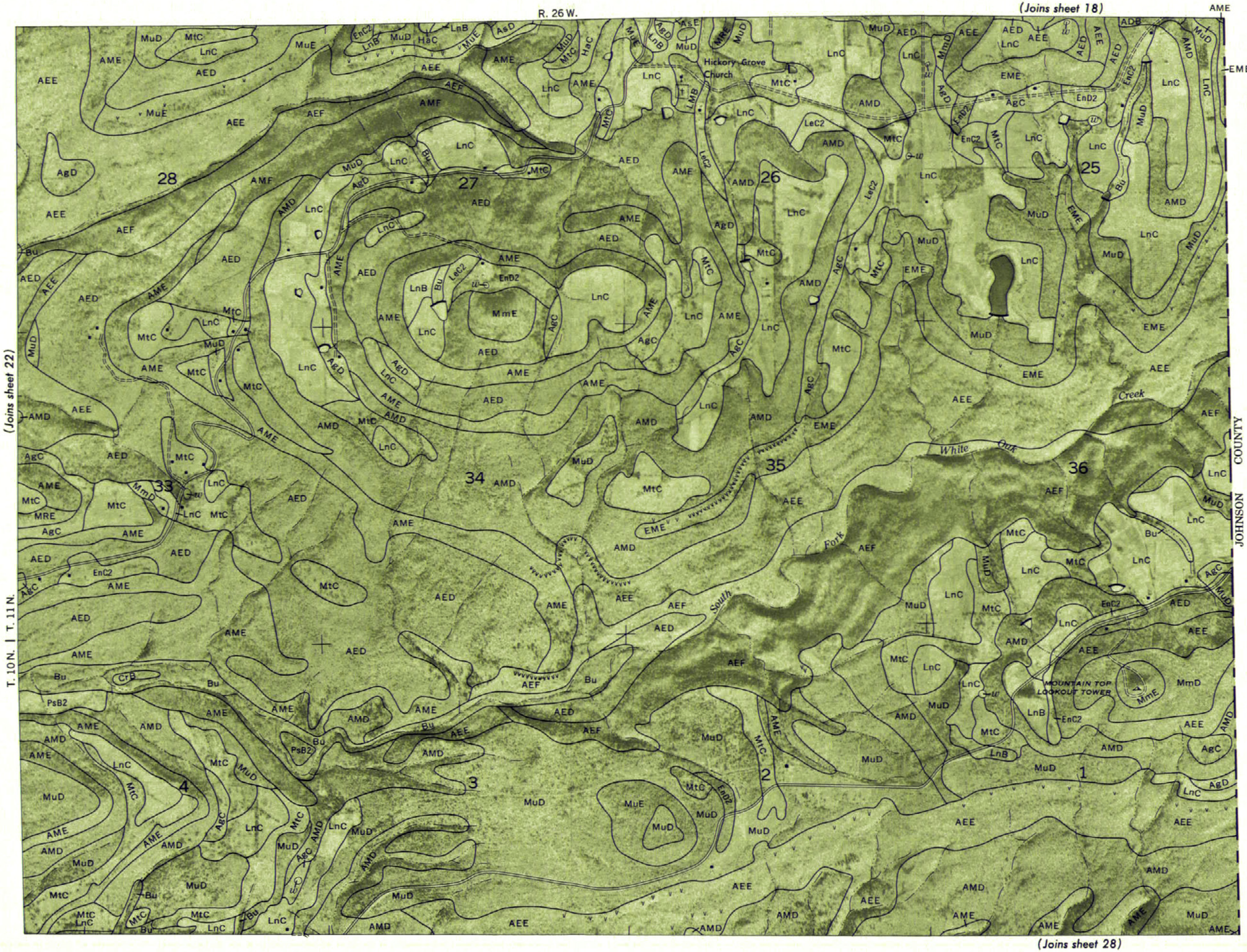
5000 Feet

Scale 1:20000



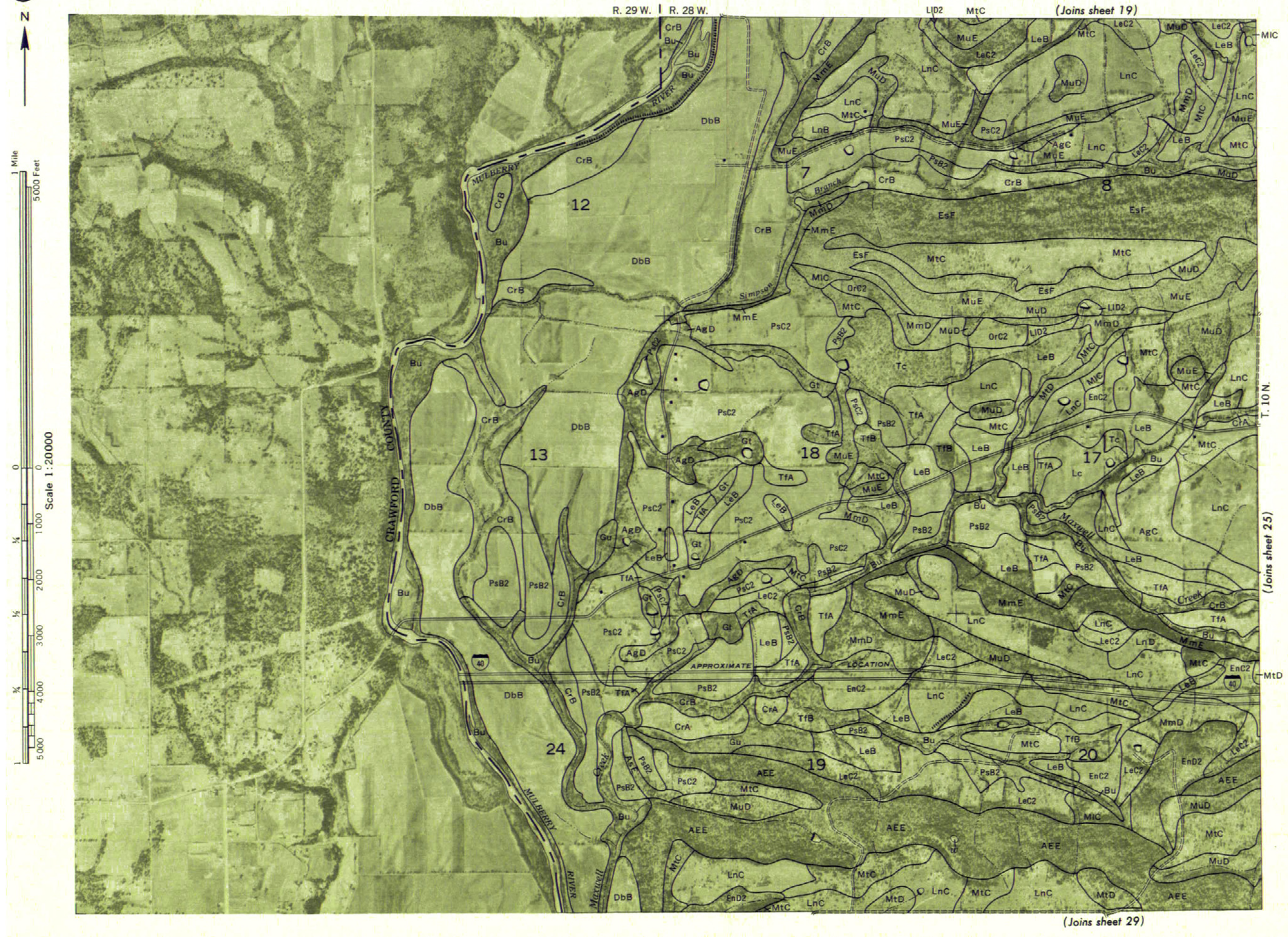
FRANKLIN COUNTY, ARKANSAS NO. 22

FRANKLIN COUNTY, ARKANSAS — SHEET NUMBER 23



This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, Arkansas Agricultural Experiment Station and the U. S. Forest Service.
Land division corners and numbers shown on this map are indefinite.

FRANKLIN COUNTY, ARKANSAS NO. 23


N
1 Mile
5000 Feet
Scale 1:20000
R. 29 W.
R. 28 W.
(Joins sheet 19)
(Joins sheet 25)
(Joins sheet 29)
T. 10 N.
MtD
MIC
APPROXIMATE LOCATION
CRAWFORD COUNTY
FRANKLIN COUNTY
MULBERRY RIVER
Maxwell Creek
Simpson Branch
7
8
12
13
18
17
24
19
20
CrB
Bu
DbB
MmE
MmD
MuD
MuE
MtC
LnC
LeB
PsC2
PsB2
AgD
AgC
EsF
LeC2
LnD
LlD2
OrC2
EnC2
EnD2
TfA
TfB
Gt
Tc
Lc
CrA
Gu
AEE

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, Arkansas Agricultural Experiment Station and the U. S. Forest Service.
Land division corners and numbers shown on this map are indefinite.

FRANKLIN COUNTY, ARKANSAS NO. 25

R. 28 W.

T. 10 N.

(Joins sheet 24)

(Joins sheet 20)

(Joins sheet 26)

(Joins sheet 30)

Lone Elm

Toney

Cravens Creek

Maxwell Creek

Cedar Creek

Oak Creek

Wallace Creek

APPROXIMATE LOCATION

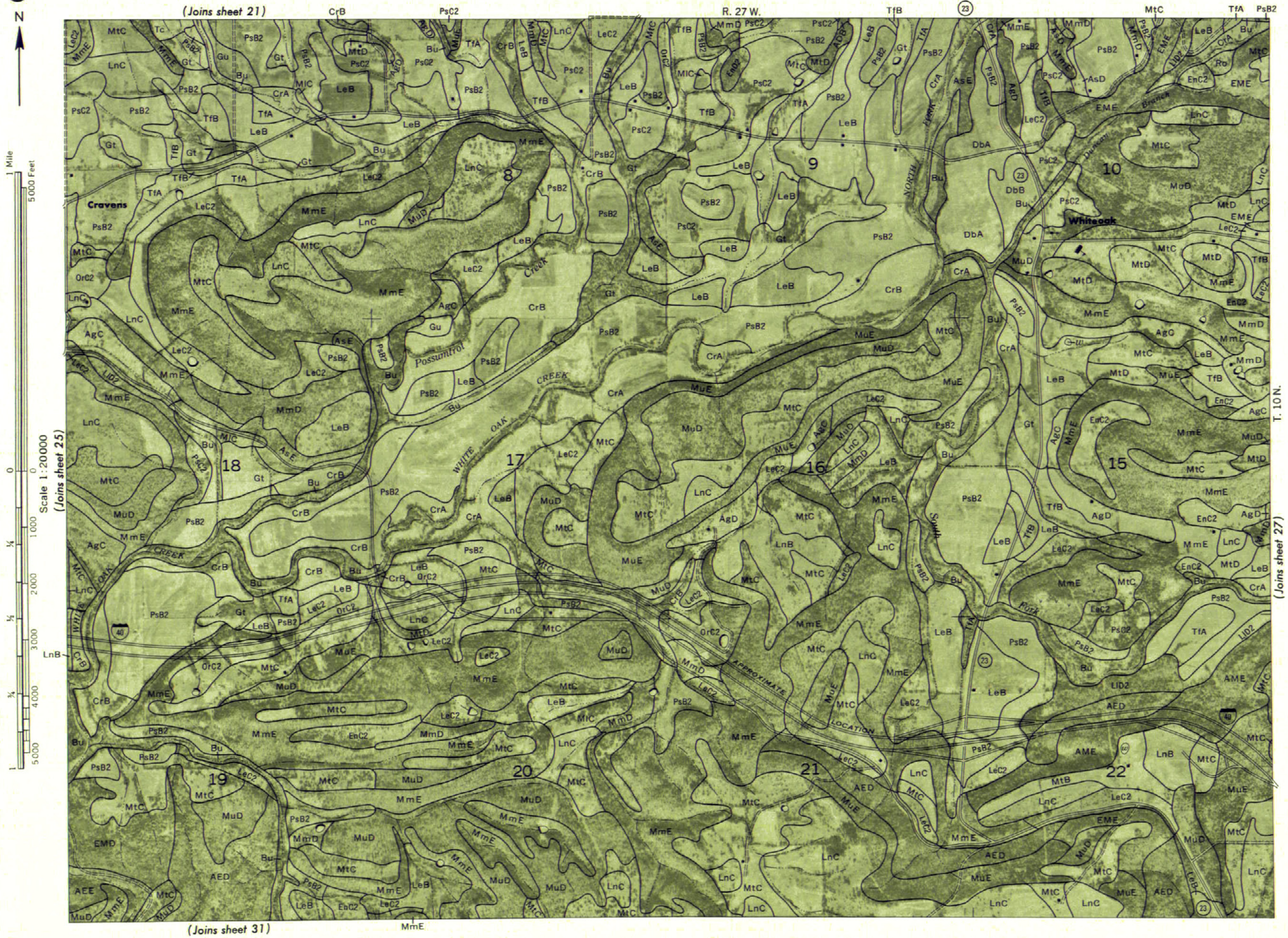
N

1 Mile

5000 Feet

Scale 1:20000

26


N
(Joins sheet 21)
R. 27 W.
T. 10 N.
(Joins sheet 25)
(Joins sheet 27)
(Joins sheet 31)
Scale 1:20000
1 Mile
5000 Feet
Cravens
Whiteoak
Possumtrot
CREEK
WHITE OAK CREEK
NORTH FORK
South Fork
Duncan Branch
APPROXIMATE LOCATION
7
8
9
10
15
16
17
18
19
20
21
22

FRANKLIN COUNTY, ARKANSAS — SHEET NUMBER 27

27

N

R. 27 W. | R. 26 W.

T. 10 N.

(Joins sheet 22)

(Joins sheet 26)

(Joins sheet 28)

(Joins sheet 32)

Gar Creek Church

APPROXIMATE LOCATION

Scale 1:20000

1 Mile 5000 Feet 1000 2000 3000 4000 5000

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, Arkansas Agricultural Experiment Station and the U. S. Forest Service.
Land division corners and numbers shown on this map are indefinite.

FRANKLIN COUNTY, ARKANSAS NO. 27

N

(Joins sheet 23)

R. 26 W.

T. 10 N.

JOHNSON COUNTY

Sutherland Crossroads

McKinney Creek

Scale 1 : 20000
1 Mile
5000 Feet
0 0
1000 2000 3000 4000 5000

(Joins sheet 27)

(Joins sheet 33)

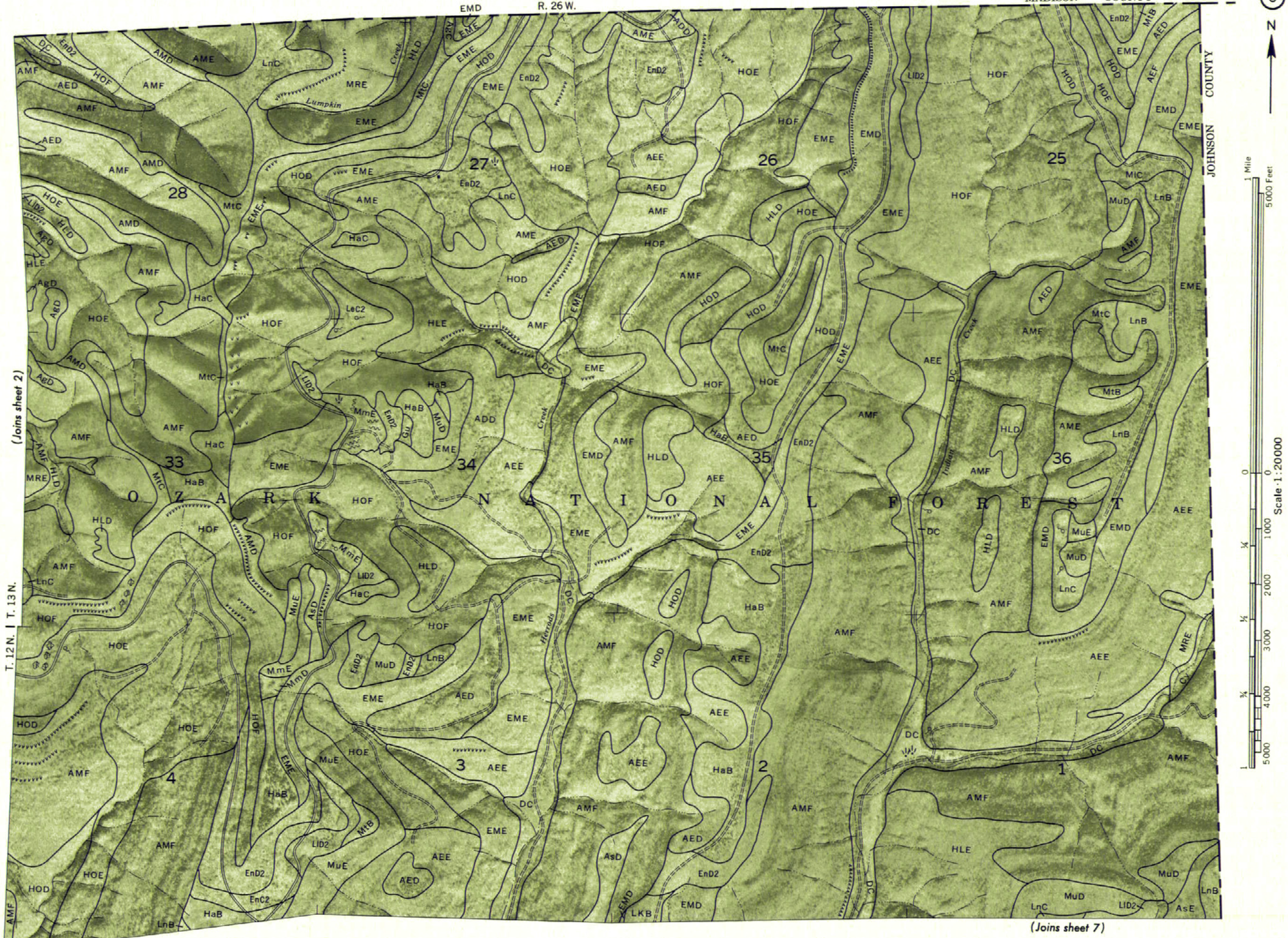
FRANKLIN COUNTY, ARKANSAS NO. 28

Land division corners and numbers shown on this map are indefinite.

FRANKLIN COUNTY, ARKANSAS NO. 29

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, Arkansas Agricultural Experiment Station and the U. S. Forest Service.
Land division corners and numbers shown on this map are indefinite.

FRANKLIN COUNTY, ARKANSAS — SHEET NUMBER 3



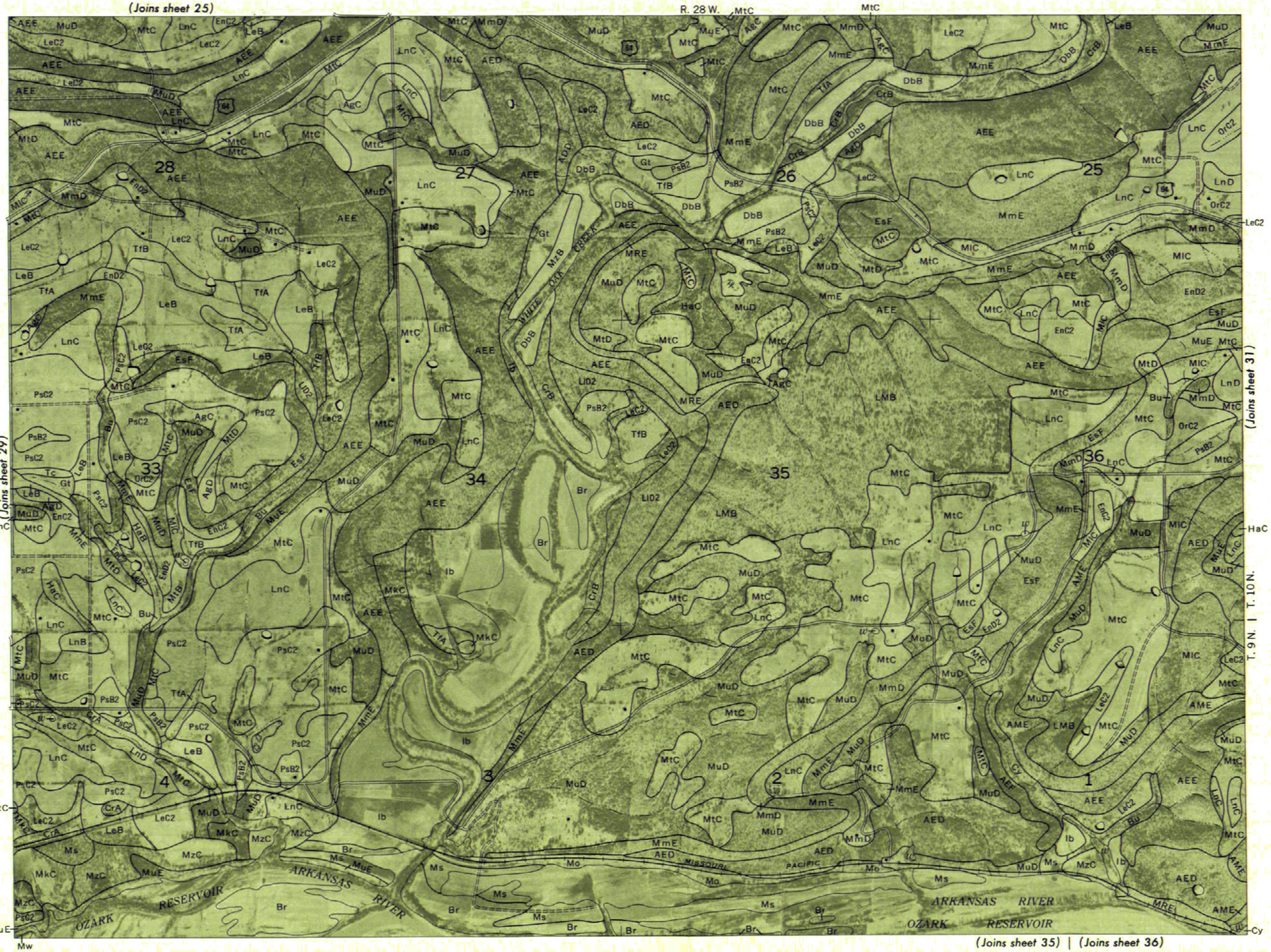
FRANKLIN COUNTY, ARKANSAS NO. 3

30

N

(Joins sheet 25)

R. 28 W.



1 Mile
5000 Feet
Scale 1:20000
0 1000 2000 3000 4000 5000

(Joins sheet 29)

(Joins sheet 31)

T. 9 N. | T. 10 N.

FRANKLIN COUNTY, ARKANSAS NO. 30

(Joins sheet 35) | (Joins sheet 36)

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, Arkansas Agricultural Experiment Station and the U. S. Forest Service.
Land division corners and numbers shown on this map are indefinite.

FRANKLIN COUNTY, ARKANSAS NO. 31

R. 27 W.

(Joins sheet 26)

(Joins sheet 30)

T. 9 N. | T. 10 N.

(Joins sheet 32)

(Joins sheet 36) | (Joins sheet 37)

31

N

1 Mile
5000 Feet

Scale 1:20000

N

R. 27 W. | R. 26 W.

(Joins sheet 27)

(Joins sheet 31)

(Joins sheet 33)

(Joins sheet 37)

T. 9 N. | T. 10 N.

1 Mile

5,000 Feet

Scale 1:20000

OZARK
(County Seat)

South Ozark

Webb City

OZARK RESERVOIR

ARKANSAS RIVER

OZARK LOCK AND DAM

MISSOURI PACIFIC

APPROXIMATE LOCATION

Gut Creek

Fork Creek

Bu Creek

FRANKLIN COUNTY, ARKANSAS NO. 32

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, Arkansas Agricultural Experiment Station and the U. S. Forest Service.
Land division corners and numbers shown on this map are indefinite.

FRANKLIN COUNTY, ARKANSAS NO. 33

FRANKLIN COUNTY, ARKANSAS — SHEET NUMBER 33

N

1 Mile
5,000 Feet
Scale 1:20000

R. 29 W. | R. 28 W.

(Joins sheet 29)

T. 9 N.

(Joins sheet 35)

(Joins sheet 39)

SEBASTIAN CO

CRAWFORD CO

CRAWFORD COUNTY

ARKANSAS RIVER

MULBERRY RIVER

OZARK RESERVOIR

ARKANSAS RIVER

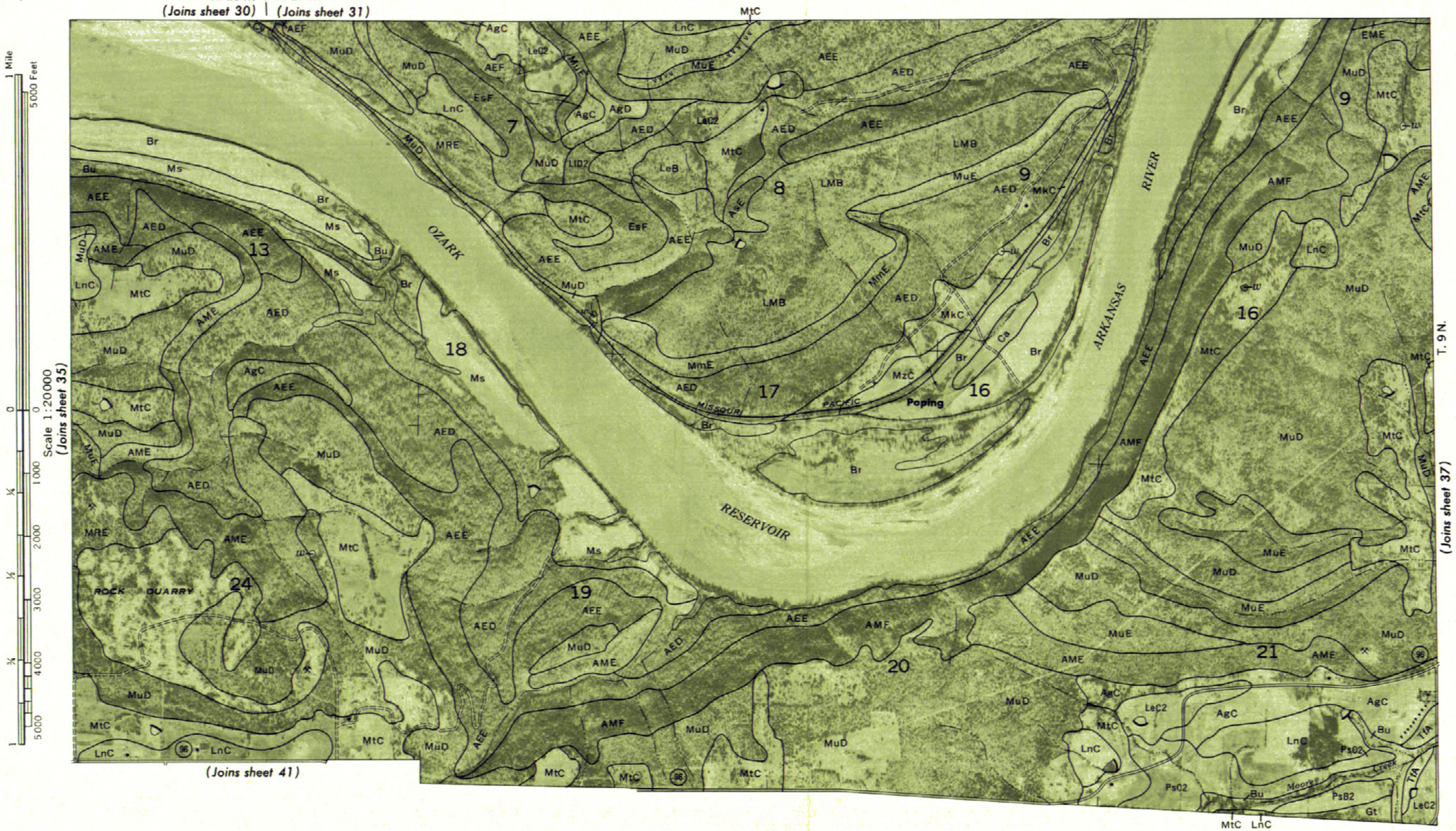
11 12 13 14 7 8 18 19 22 23 24

Ms Mo Mw MzC Br Bu Ib EnC2 MtC EME MkC AEE AED AME HaC HaB LnC LnB MuD MuE LID2

35

N

FRANKLIN COUNTY, ARKANSAS NO. 35


36
N
R. 28 W.
(Joins sheet 30)
R. 27 W.
(Joins sheet 31)
1 Mile
5000 Feet
Scale 1:20000
(Joins sheet 35)
OZARK
RESERVOIR
ARKANSAS
RIVER
MISSOURI
PACIFIC
Poping
ROCK QUARRY
T. 9 N.
(Joins sheet 37)
(Joins sheet 41)
FRANKLIN COUNTY, ARKANSAS NO. 36

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, Arkansas Agricultural Experiment Station and the U. S. Forest Service.
Land division corners and numbers shown on this map are indefinite.

FRANKLIN COUNTY, ARKANSAS NO. 37

(Joins sheet 31) | (Joins sheet 32)

R. 27 W. | R. 26 W.

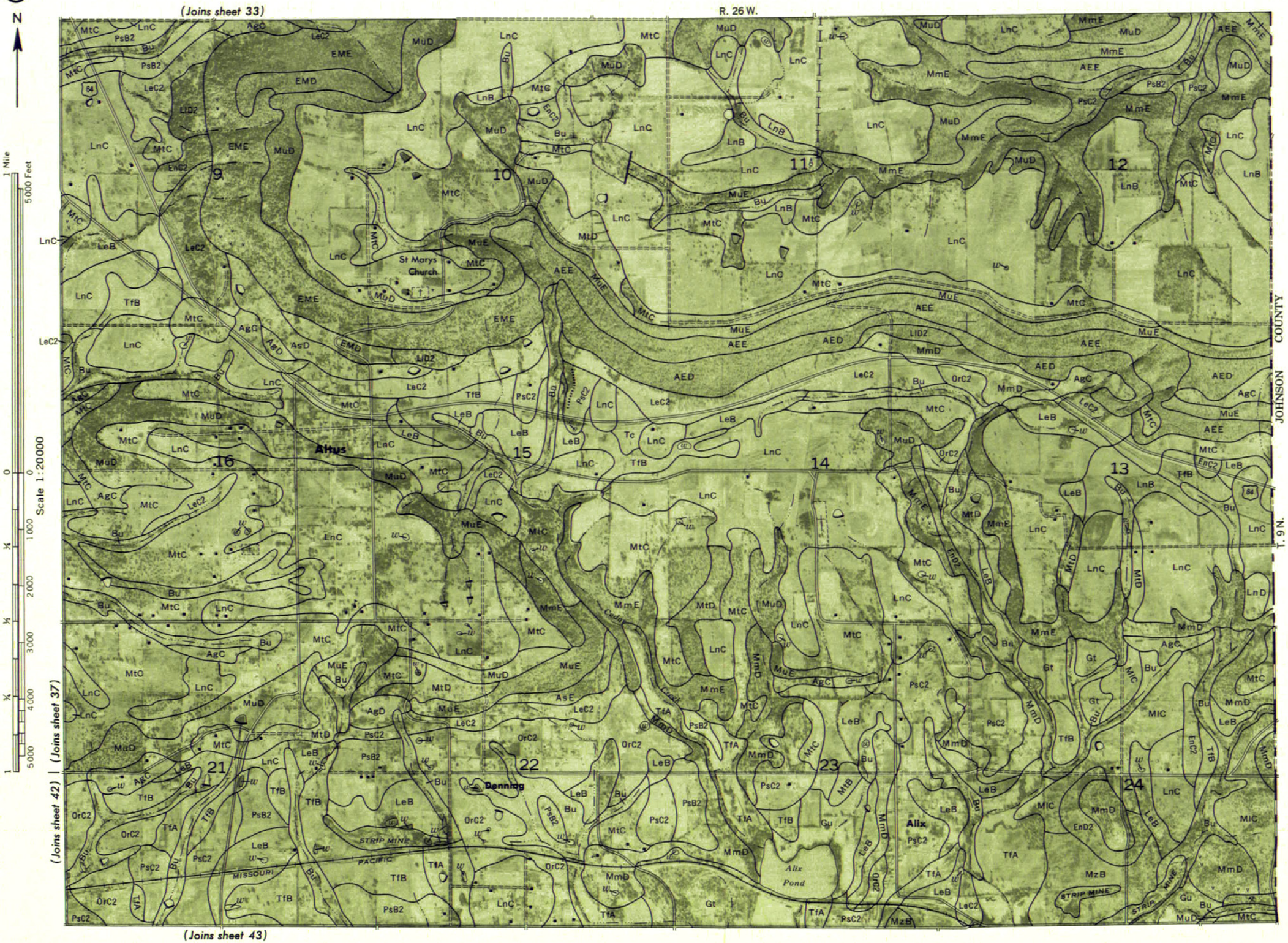
T. 9 N.

(Joins sheet 36)
(Joins sheet 38)
(Joins sheet 42)

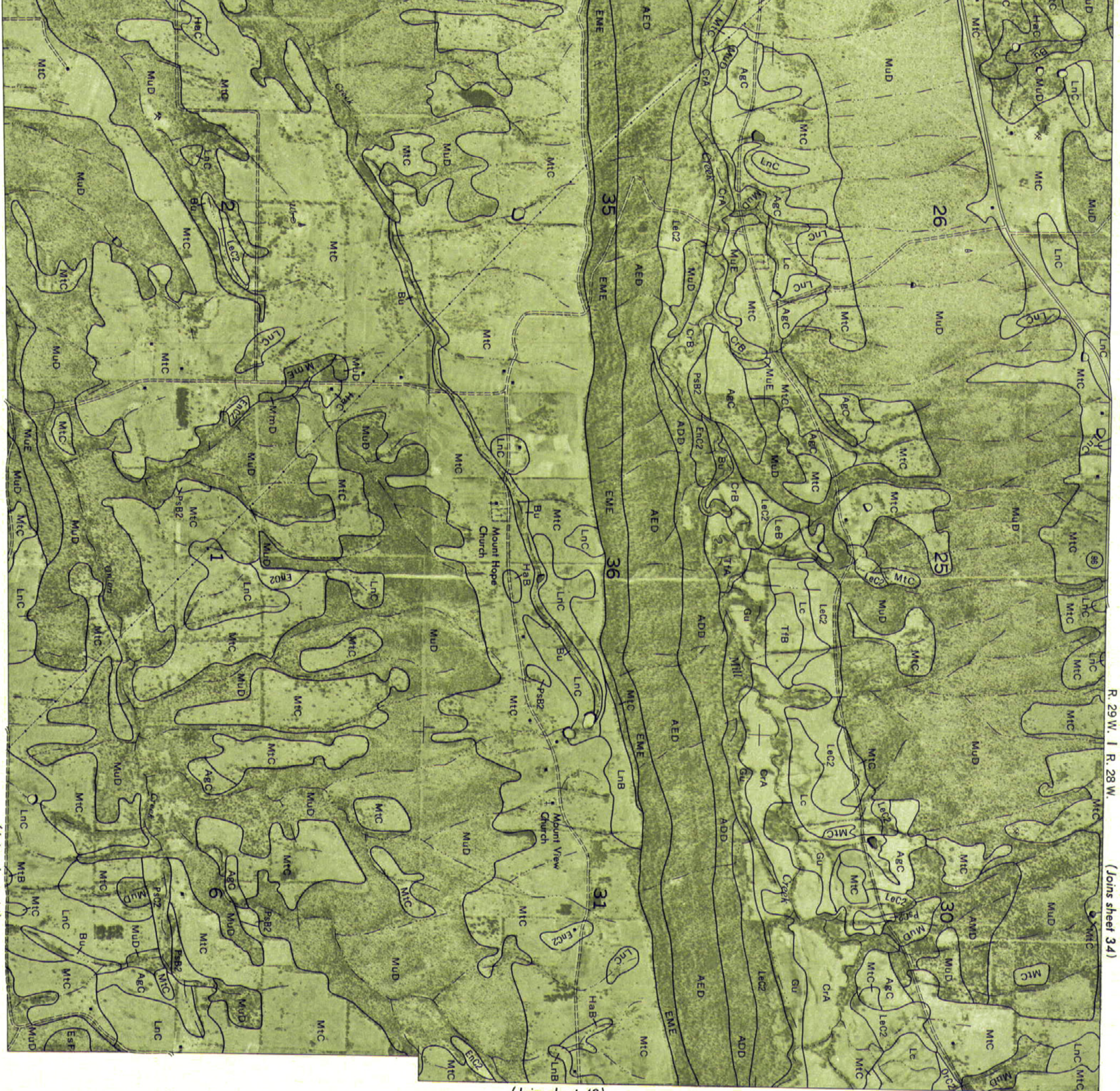
N

1 Mile
5000 Feet

Scale 1:20000



FRANKLIN COUNTY, ARKANSAS NO. 38



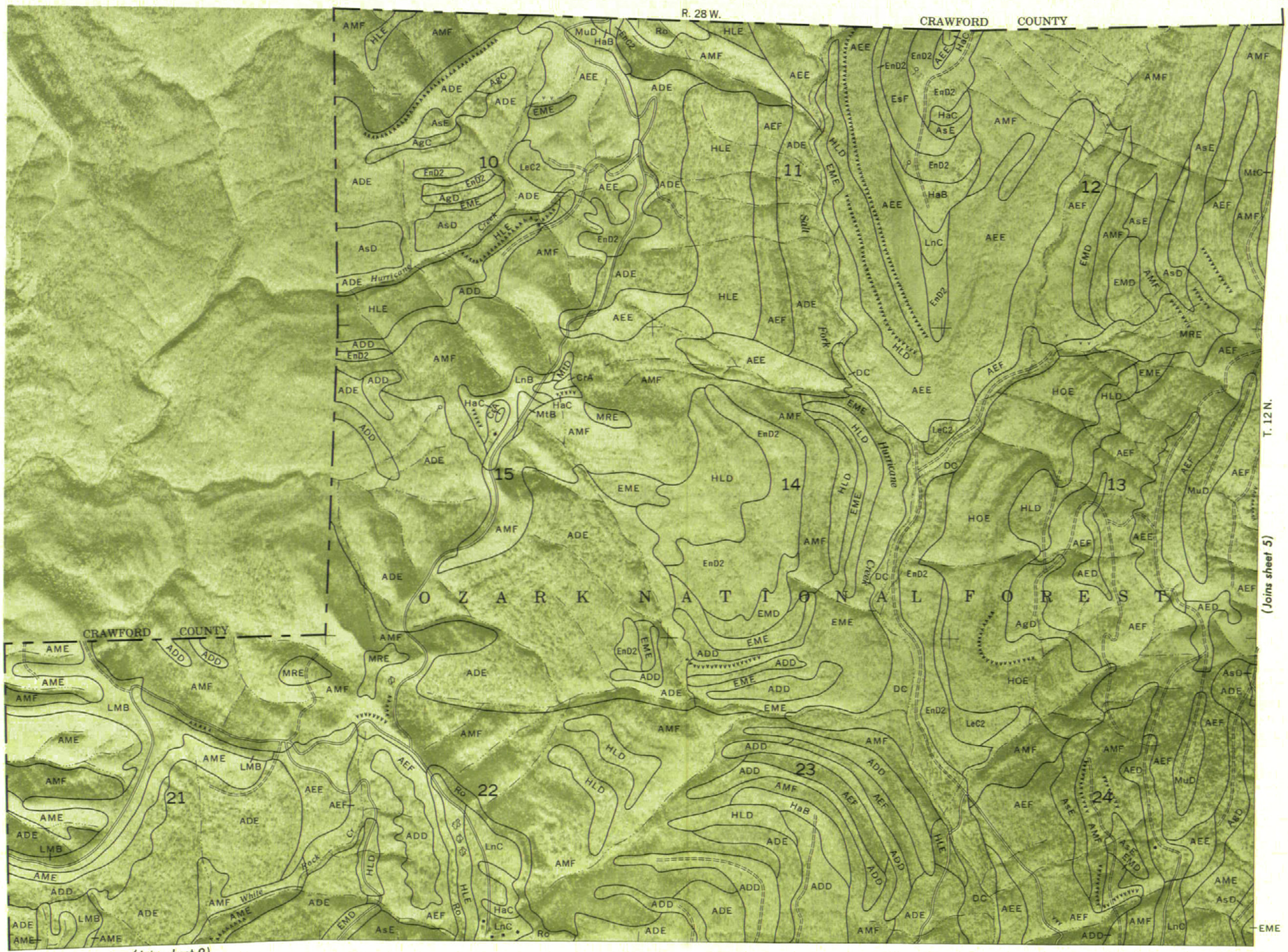
(Joins sheet 40)

1 ¾ ½ ¼ 0 1 Mile

5000 4000 3000 2000 1000 0 5000 Feet

Scale 1:20000

→ N



N

Scale 1:20000

1 Mile 0 5000 Feet

¼ 1000 ¼ 2000 ¾ 3000 ¼ 4000 5000

FRANKLIN COUNTY, ARKANSAS NO. 4

Land division corners and numbers shown on this map are indefinite.

This map is one of a set compiled in 1966 as part of a survey by the Soil Conservation Service

40

N

1 Mile

5000 Feet

Scale · 1:20000

0 0

¼ 1000

½ 2000

¾ 3000

1 4000

5000

R. 28 W. | R. 27 W. FRANKLIN COUNTY, ARKANSAS — SHEET NUMBER 41

41

N

(Joins sheet 36)

(Joins sheet 40)

(Joins sheet 42)

(Joins sheet 46)

T. 8 N. | T. 9 N.

1 Mile
5,000 Feet
Scale 1:20000

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, Arkansas Agricultural Experiment Station and the U. S. Forest Service.
Land division corners and numbers shown on this map are indefinite.

FRANKLIN COUNTY, ARKANSAS NO. 41


42
N
(Joins sheet 37)
R. 27 W.
R. 26 W.
(Joins sheet 43)
(Joins sheet 38)
(Joins sheet 41)
(Joins sheet 47)
1 Mile
5000 Feet
Scale 1:20000
PILOT GROVE CEMETERY
RIDGE CEMETERY
PACIFIC
ARKANSAS
LOGAN COUNTY
COUNTY
RIVER
Smith
Creek
T. 8N.
T. 9N.
FRANKLIN COUNTY, ARKANSAS NO. 42

FRANKLIN COUNTY, ARKANSAS — SHEET NUMBER 43

43

N

R. 26 W.

(Joins sheet 38)

(Joins sheet 42)

T. 8 N. | T. 9 N.

(Joins sheet 48)

Greenwood

Alix

GREENWOOD CEMETERY

STRIP MINE

PACIFIC STRIP MINE

Cedar Creek

ARKANSAS RIVER

LOGAN COUNTY

JOHNSON COUNTY

1 Mile

5,000 Feet

Scale 1:20000

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, Arkansas Agricultural Experiment Station and the U. S. Forest Service.
Land division corners and numbers shown on this map are indefinite.

FRANKLIN COUNTY, ARKANSAS NO. 43


(44)
N
(Joins sheet 39)
R. 29 W.
R. 28 W.
T. 8 N.
1 Mile
5000 Feet
Scale 1:20000
SEBASTIAN COUNTY
Vesta
Hall Creek
Sulphur Springs Branch
STRIP MINE
(Joins sheet 45)
(Joins sheet 49)
FRANKLIN COUNTY, ARKANSAS NO. 44

FRANKLIN COUNTY, ARKANSAS — SHEET NUMBER 45

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, Arkansas Agricultural Experiment Station and the U. S. Forest Service.
Land division corners and numbers shown on this map are indefinite.

FRANKLIN COUNTY, ARKANSAS NO. 45

R. 28 W.

T. 8 N.

(Joins sheet 40)

(Joins sheet 44)

(Joins sheet 46)

(Joins sheet 50)

Lake No 21

Lake No 22

Lake No 23

Hurricane Creek

Peter Pender

Grand Prairie Church

STRIP MINE

Scale 1:20000

1 Mile

5000 Feet

FRANKLIN COUNTY, ARKANSAS — SHEET NUMBER 46

FRANKLIN COUNTY, ARKANSAS NO. 46

FRANKLIN COUNTY, ARKANSAS — SHEET NUMBER 47

FRANKLIN COUNTY, ARKANSAS NO. 47

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, Arkansas Agricultural Experiment Station and the U. S. Forest Service. Land division corners and numbers shown on this map are indefinite.

48

N

FRANKLIN COUNTY, ARKANSAS NO. 48

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, Arkansas Agricultural Experiment Station and the U. S. Forest Service.
Land division corners and numbers shown on this map are indefinite.

FRANKLIN COUNTY, ARKANSAS NO. 49

R. 29 W. | R. 28 W.

(Joins sheet 44)

SEBASTIAN COUNTY

T. 7 N. | T. 8 N.

(Joins sheet 50)

(Joins sheet 53)

49

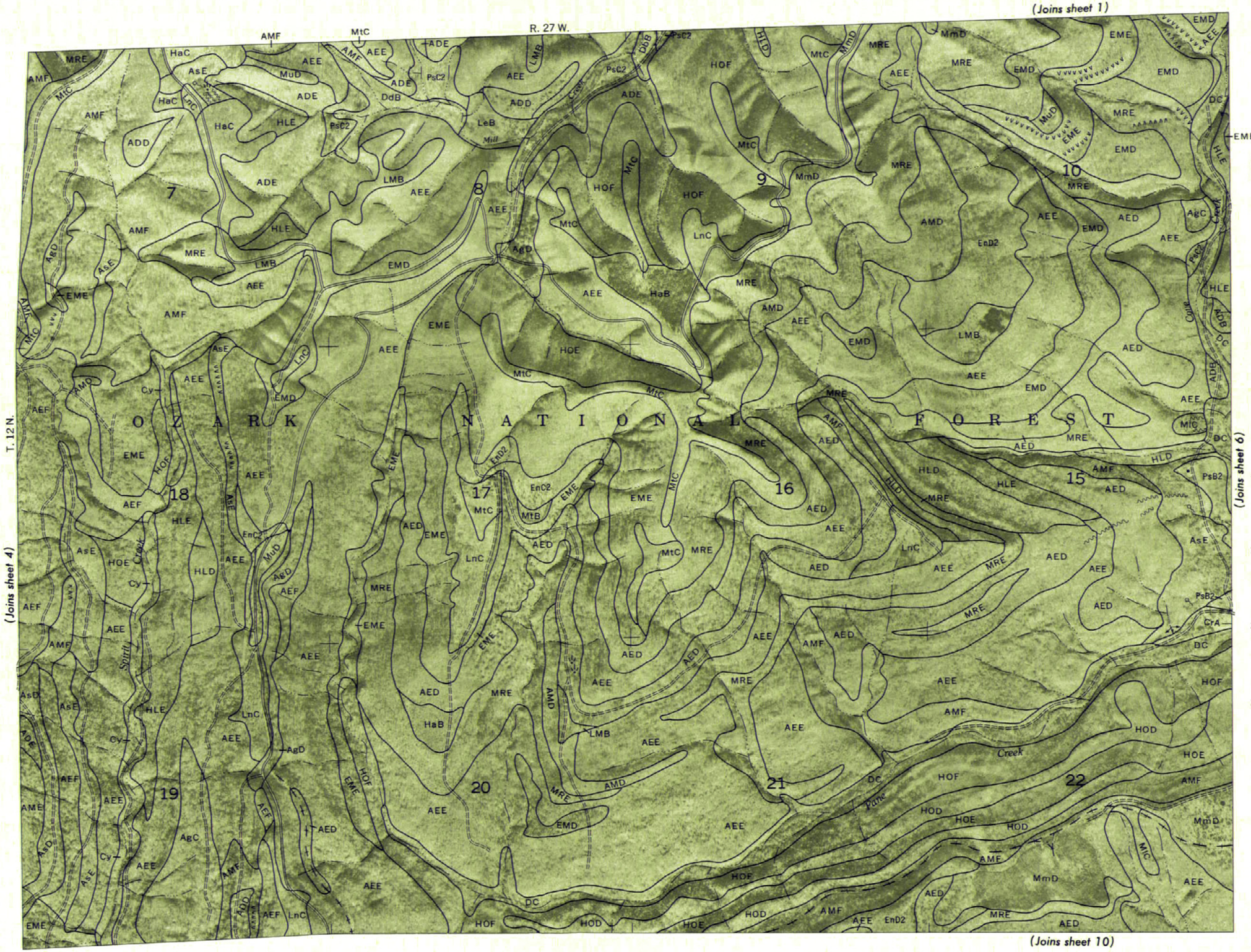
N

1 Mile

5000 Feet

Scale 1:20000

FRANKLIN COUNTY, ARKANSAS — SHEET NUMBER 5



This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, Arkansas Agricultural Experiment Station and the U. S. Forest Service.
Land division corners and numbers shown on this map are indefinite.

FRANKLIN COUNTY, ARKANSAS NO. 5

50

N

(Joins sheet 45)

R. 28 W.

(Joins sheet 51)

T. 7 N. | T. 8 N.

1 Mile

5000 Feet

Scale 1:20000

(Joins sheet 49)

(Joins sheet 54)

STRIP MINE

Lake No 24

PACIFIC MISSOURI BRANCH

Purdy Creek

29 28 27 26 32 33 34 35 5 4 3 2

FRANKLIN COUNTY, ARKANSAS NO. 50

FRANKLIN COUNTY, ARKANSAS — SHEET NUMBER 51

(Joins sheet 46)

R. 28 W. | R. 27 W.

T. 7 N. | T. 8 N.

(Joins sheet 50)

(Joins sheet 55)

(Joins sheet 52)

LOGAN COUNTY

51

N

1 Mile

5000 Feet

Scale 1:20000

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, Arkansas Agricultural Experiment Station and the U. S. Forest Service.
Land division corners and numbers shown on this map are indefinite.

FRANKLIN COUNTY, ARKANSAS NO. 51

52

N

(Joins sheet 47)

R. 27 W.

(Joins sheet 51)

Scale 1:20000

1 Mile 5000 Feet

0 0

¼ 1000

½ 2000

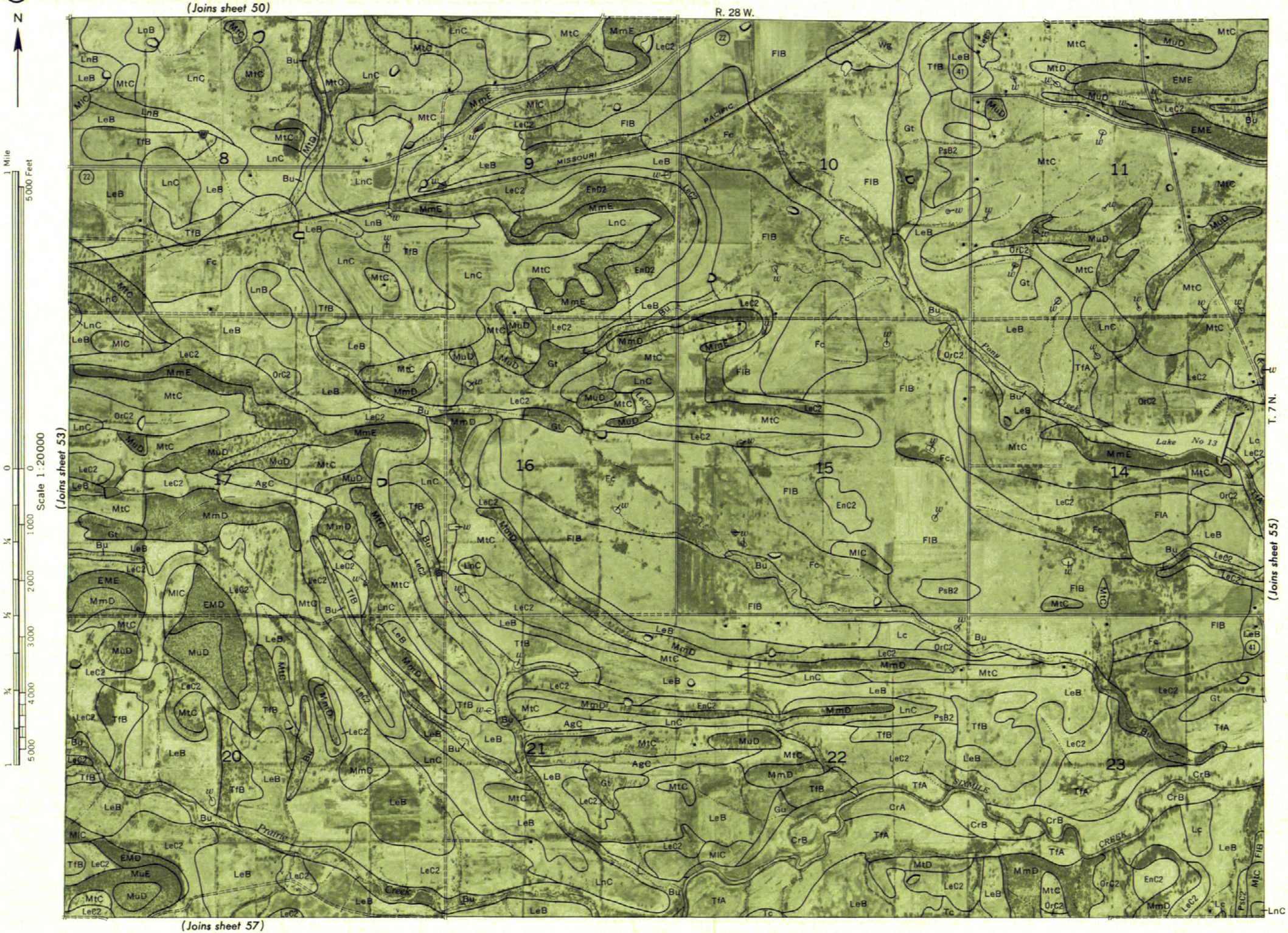
¾ 3000

1 4000 5000

FRANKLIN COUNTY, ARKANSAS NO. 52

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, Arkansas Agricultural Experiment Station and the U. S. Forest Service.
Land division corners and numbers shown on this map are indefinite.

FRANKLIN COUNTY, ARKANSAS NO. 53


(Joins sheet 50)
R. 28 W.
T. 7 N.
N
1 Mile
5000 Feet
Scale 1:20000
(Joins sheet 53)
(Joins sheet 55)
(Joins sheet 57)
PACIFIC
MISSOURI
Prairie
Creek
Lake No 13
SPAVINAW
CREEK
8
9
10
11
14
15
16
17
20
21
22
23

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, Arkansas Agricultural Experiment Station and the U. S. Forest Service.
Land division corners and numbers shown on this map are indefinite.

FRANKLIN COUNTY, ARKANSAS NO. 55

55

N

R. 28 W. (Joins sheet 51)

T. 7 N.

LOGAN COUNTY

(Joins sheet 54)

(Joins upper right, INSET A)

INSET A

R. 28 W. (Joins lower left)

T. 7 N.

LOGAN COUNTY

(Joins sheet 57)

INSET B

R. 29 W. (Joins sheet 56)

COUNTY

SEBASTIAN COUNTY

T. 6 N.

FORT CHAFFEE MILITARY RESERVATION

1 Mile 5000 Feet

Scale 1:20000

56

N

(Joins sheet 53)

R. 29 W. | R. 28 W.

(Joins sheet 57)

T. 6 N. | T. 7 N.

FORT CHAFFEE MILITARY RESERVATION

SEBASTIAN COUNTY

FRANKLIN COUNTY

LOGAN COUNTY

FREE PASSAGE BOUNDARY

MILITARY

Creek

Scale 1:20000

1 Mile 5000 Feet

0 0

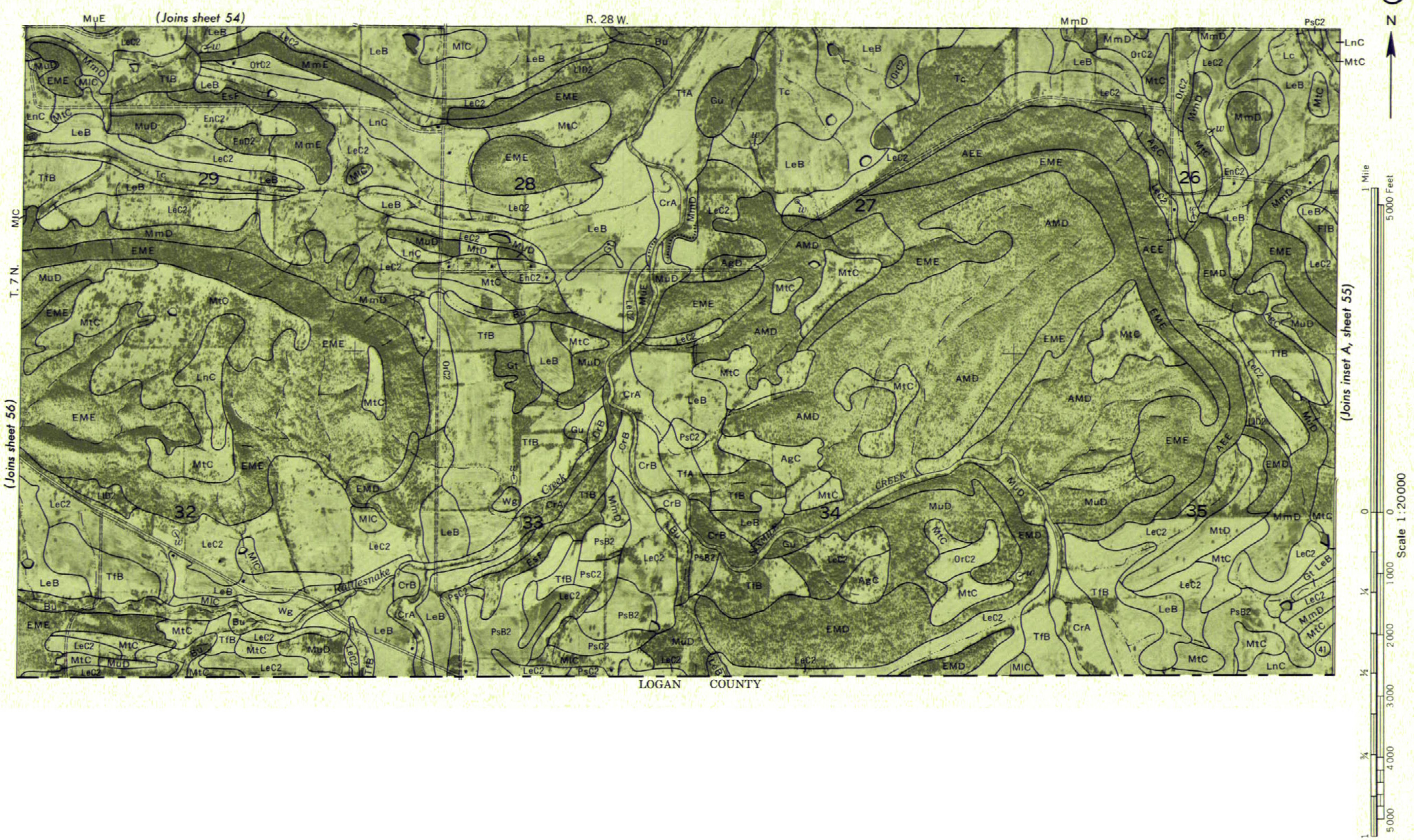
¼ 1000

½ 2000

¾ 4000

1 5000

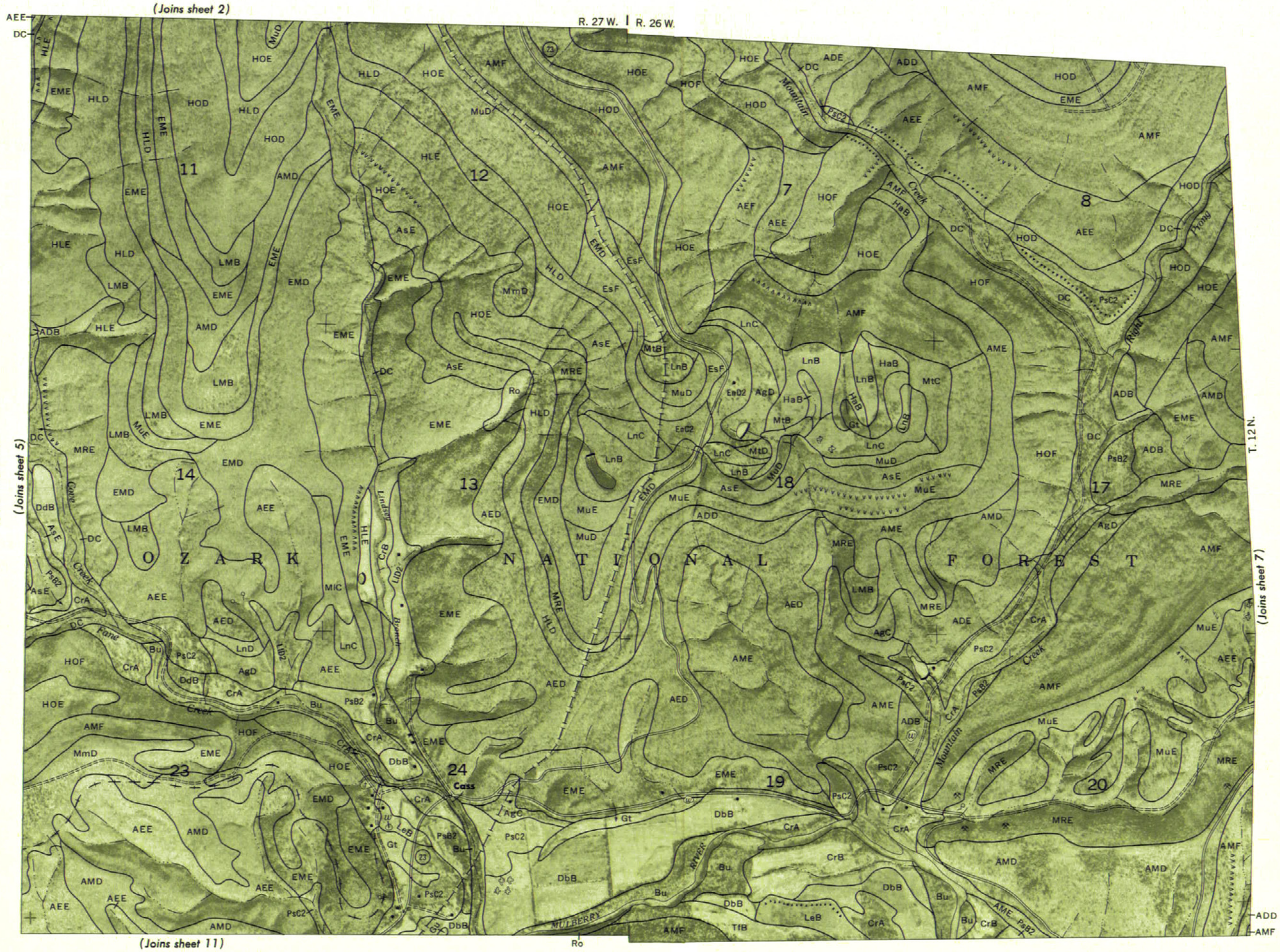
(Joins inset B, sheet 55)



This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, Arkansas Agricultural Experiment Station and the U. S. Forest Service.

Land division corners and numbers shown on this map are indefinite.

FRANKLIN COUNTY, ARKANSAS NO. 57



FRANKLIN COUNTY, ARKANSAS NO. 6

Land division corners and numbers shown on this map are indefinite.

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, Arkansas Agricultural Experiment Station

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FRANKLIN COUNTY, ARKANSAS NO. 7

R. 26 W.

(Joins sheet 3)

T. 12 N.

(Joins sheet 6)

(Joins sheet 12)

OZARK NATIONAL FOREST

JOHNSON COUNTY

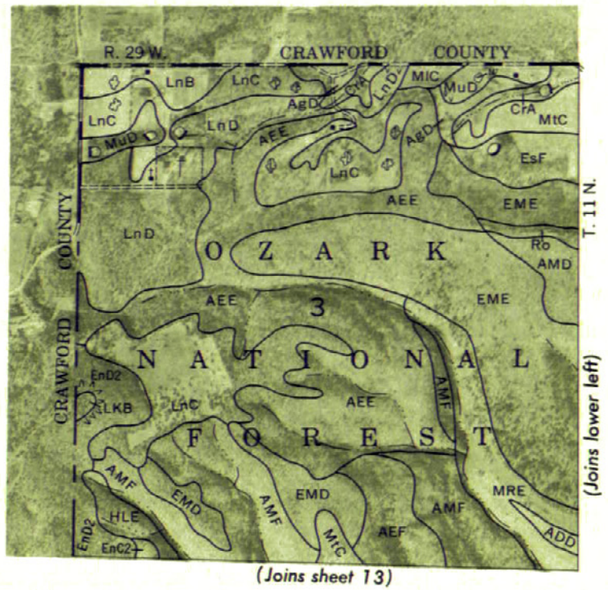
Scale 1:20000

1 Mile

5000 Feet

N

7



1 Mile
5,000 Feet
Scale 1:20000
0 1000 2000 3000 4000 5000

FRANKLIN COUNTY, ARKANSAS NO. 8

This map is one of a set compiled in 1968 as part of a soil survey by the Soil Conservation Service, United States Department of Agriculture, Arkansas Agricultural Experiment Station and the U. S. Forest Service.
Land division corners and numbers shown on this map are indefinite.

FRANKLIN COUNTY, ARKANSAS NO. 9

9

N

R. 28 W.

(Joins sheet 4)

(Joins sheet 8)

(Joins sheet 10)

(Joins sheet 15)

CRAWFORD COUNTY

T. 12 N.

T. 11 N.

OZARK NATIONAL FOREST

1 Mile

5000 Feet

Scale 1:20000

CONVENTIONAL SIGNS

WORKS AND STRUCTURES

Highways and roads
- Dual
- Good motor
- Poor motor
- Trail

Highway markers
- National Interstate
- U. S.
- State or county

Railroads
- Single track
- Multiple track
- Abandoned

Bridges and crossings
- Road
- Trail, foot
- Railroad
- Ferry (FY)
- Ford (FORD)
- Grade
- R. R. over
- R. R. under
- Tunnel

Buildings
- School
- Church

Station, forest fire or lookout

Mines and Quarries

Mine dump

Pits, gravel or other

Power line

Pipeline

Cemetery

Dams

Levee

Tanks

Well, oil or gas

BOUNDARIES

- National or state
- County
- Reservation
- Land grant
- Small park, cemetery, airport
- Land survey division corners

DRAINAGE

Streams, double-line
- Perennial
- Intermittent

Streams, single-line
- Perennial
- Intermittent
  - Crossable with tillage implements
  - Not crossable with tillage implements
- Unclassified

Canals and ditches (CANAL)

Lakes and ponds
- Perennial (water, w)
- Intermittent

Wells, water (flowing)

Spring

Marsh or swamp

Wet spot

Alluvial fan

Drainage end

RELIEF

Escarpments
- Bedrock
- Other

Prominent peak

Depressions

	Large	Small
Crossable with tillage implements		
Not crossable with tillage implements		
Contains water most of the time		

SOIL SURVEY DATA

- Soil boundary and symbol (Dx)
- Gravel
- Stony, very stony
- Rock outcrops
- Chert fragments
- Clay spot
- Sand spot
- Gumbo or scabby spot
- Made land
- Severely eroded spot
- Blowout, wind erosion
- Gully

Soil map constructed 1968 by Cartographic Division, Soil Conservation Service, USDA, from 1961 aerial photographs. Controlled mosaic based on Arkansas plane coordinate system, north zone, Lambert conformal conic projection, 1927 North American datum.

SOIL LEGEND

The first letter, always a capital, is the initial one of the soil name. The second letter is a capital if the mapping unit is one of the low intensity survey; it is a small letter if the mapping unit is one of the medium intensity survey. The third capital letter, A, B, C, D, E, or F, shows the slope. Most symbols without a slope letter are those of nearly level soils, but some are for land types that have a considerable range of slope. A final number, 2, in the symbol, shows that the soil is eroded.

LOW INTENSITY 1/

SYMBOL	NAME
ADB	Allen soils, gently rolling
ADD	Allen soils, rolling
ADE	Allen soils, steep
AED	Allen–Enders association, rolling
AEE	Allen–Enders association, steep
AEF	Allen–Enders association, very steep
AMD	Allen–Mountainburg association, rolling
AME	Allen–Mountainburg association, steep
AMF	Allen–Holston association, very steep
DC	Dubbs and Cleora soils
EMD	Enders–Mountainburg association, rolling
EME	Enders–Mountainburg association, steep
HLD	Holston soils, rolling
HLE	Holston soils, steep
HOD	Holston–Enders association, rolling
HOE	Holston–Enders association, steep
HOF	Holston–Enders association, very steep
LKB	Linker soils, gently rolling
LMB	Linker–Mountainburg association, gently rolling
MRE	Mountainburg–Rock land association, steep

1/ The composition of these units is more variable than that of the other units in the county but has been controlled well enough to interpret for the expected use of the soils concerned.

MEDIUM INTENSITY

SYMBOL	NAME
AgC	Allen gravelly fine sandy loam, 3 to 8 percent slopes
AgD	Allen gravelly fine sandy loam, 8 to 12 percent slopes
AsD	Allen stony fine sandy loam, 8 to 12 percent slopes
AsE	Allen stony fine sandy loam, 12 to 45 percent slopes
Br	Bruno loamy fine sand
Bu	Bruno and luka soils
Ca	Caspiana silt loam
CrA	Cleora fine sandy loam, 0 to 1 percent slopes
CrB	Cleora fine sandy loam, 1 to 3 percent slopes
Cy	Cobbly alluvial land
DbA	Dubbs fine sandy loam, 0 to 1 percent slopes
DbB	Dubbs fine sandy loam, 1 to 3 percent slopes
EnC2	Enders gravelly silt loam, 3 to 8 percent slopes, eroded
EnD2	Enders gravelly silt loam, 8 to 20 percent slopes, eroded
EsF	Enders stony fine sandy loam, 12 to 50 percent slopes
Fc	Falkner complex, mounded
FlA	Falkner silt loam, 0 to 1 percent slopes
FlB	Falkner silt loam, 1 to 3 percent slopes
Gt	Guthrie silt loam
Gu	Guthrie silt loam, flooded
HaB	Hartsells fine sandy loam, 1 to 3 percent slopes
HaC	Hartsells fine sandy loam, 3 to 8 percent slopes
Ib	Iberia clay
Lc	Leadvale complex, mounded
LeB	Leadvale silt loam, 1 to 3 percent slopes
LeC2	Leadvale silt loam, 3 to 8 percent slopes, eroded
LlD2	Leadvale loam, 8 to 12 percent slopes, eroded
LnB	Linker fine sandy loam, 1 to 3 percent slopes
LnC	Linker fine sandy loam, 3 to 8 percent slopes
LnD	Linker fine sandy loam, 8 to 12 percent slopes
MkC	McKamie silt loam, 3 to 8 percent slopes
MlC	Montevallo gravelly silt loam, 3 to 8 percent slopes
MmD	Montevallo–Mountainburg complex, 1 to 12 percent slopes
MmE	Montevallo–Mountainburg complex, 12 to 40 percent slopes
Mo	Moreland silty clay loam
Ms	Morganfield very fine sandy loam
MtB	Mountainburg gravelly fine sandy loam, 1 to 3 percent slopes
MtC	Mountainburg gravelly fine sandy loam, 3 to 8 percent slopes
MtD	Mountainburg gravelly fine sandy loam, 8 to 12 percent slopes
MuD	Mountainburg stony fine sandy loam, 1 to 12 percent slopes
MuE	Mountainburg stony fine sandy loam, 12 to 40 percent slopes
Mw	Muldrow silt loam
MzB	Muskogee silt loam, 1 to 3 percent slopes
MzC	Muskogee silt loam, 3 to 8 percent slopes
OrC2	Ora fine sandy loam, 3 to 8 percent slopes, eroded
PsB2	Pickwick silt loam, 1 to 3 percent slopes, eroded
PsC2	Pickwick silt loam, 3 to 8 percent slopes, eroded
Ro	Rock land
Tc	Taft complex, mounded
TfA	Taft silt loam, 0 to 1 percent slopes
TfB	Taft silt loam, 1 to 3 percent slopes
Wg	Wing silt loam